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Bibliography on the Micrometeorology of Snow Cover, p. 873

7 July 1956 No. 7

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 7 JULY, 1956 No. 7

SPECIAL FEATURE IN THIS ISSUE

An Annotated Bibliography on the Micrometeorology of Snow Cover

by
Geza Thuronyi, N. T. Zikeev and Malcolm Rigby

Prepared for
U. S. Army Quartermaster Research and Development Center
Enviromental Protection Division

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of important references on a special subject. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
7. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
10. Weather Modification	11. Cooling Power	

Bibliographies published this year are:

1. Synoptic Meteorology of the Arctic, Vol. 7, No. 1, Jan. 1956
2. Climate of Enclosed Spaces, Vol. 7, No. 2, Feb. 1956
3. Cosmic Rays in the Atmosphere (–1952), Vol. 7, No. 3, March 1956
4. Cosmic Rays in the Atmosphere (1953–1956), Vol. 7, No. 4, April 1956
5. Atmospheric Radioactivity, Vol. 7, No. 5, May 1956
6. Tropospheric Inversions, Vol. 7, No. 6, June 1956
7. Snow Micrometeorology, Vol. 7, No. 7, July 1956

Forthcoming bibliographies will be:

8. Snow Micrometeorology (Supplement), Vol. 7, No. 8, Aug. 1956
9. Tropical Cyclones, Hurricanes and Typhoons, Vol. 7, No. 9, Sept. 1956

Other bibliographies in preparation are:

Actinometers	*Night Airglow*
Fog Forecasting	*Ozone*
Forest Micrometeorology	*Singularities*
Hurricane and Storm Surge Damage	*Solar-Weather Relations*
Microwave Propagation	*Synoptic Aerology*

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue cumulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where t material may be found. The Union List of Serials (Gregory) is the source of most of t symbols used. In some cases, where no symbol has been assigned to a library, one will devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by chart

Geographic locations are in the English form rather than the form used locally, for exampl Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwis stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to th Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months ar abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numbe (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus a entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau, Jahrgang* 2 (Vo 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

See also: **Researches on Snow and Ice** (Japanese Soc. of Snow & Ice), 7.7–48.

7.7–1 551.510:523.51:08 551.590.25

†Kaiser, T. R., *(ed.)*, **Meteors.** Special supplement (vol. 2) to the Journal of Atmospheric and Terrestrial Physics. London, Pergamon Press, **1955.** 204 p. numerous bibliogs. and illus. **DWB**—A collection of 39 papers which were read at the Symposium on Meteor Physics held at Jodrell Bank Experimental Station in July 1954 on invitation of PROF. A. C. B. LOVELL are printed in permanent book form. Each paper will be abstracted separately and the contents are listed in Part III, 7(7):927, July, *MAB.* The subjects treated include meteor ablation, luminosity, ionization, spectra, collision processes, radio echoes, masses, space density drift, zodiacal dust cloud, orbits as determined photographically or by radio, effects on ionosphere and upper air data obtained from meteors (pressure, winds, scale height). *Subject Headings:* **1. Meteor physics symposia 2. Ionospheric physics 3. Jodrell Bank, England.**—*M.R.*

7.7–2 551.506(058)

Great Britain. Meteorological Office, [**Meteorological observations made in the British Colonies and Protectorates, and summarised in the Annual Reports of the Colonial Governments.**] Excerpted and distributed by the Meteorological Office, London, **1910–date.** Type of reproduction varies. First date of issue of individual colony varies. Titles vary as: **Meteorological Notes; Annual Meteorological Report; Annual Observations; Summary of Observations,** etc. Usual title is **Meteorological Observations. DLC**—Meteorological observations of each colony or body are entered in MAB under that colony or body. Administrative changes in late years have altered the publication format, as well as the distribution of the observations of some of the colonies. Extract from introduction to "**Notes on the Meteorological Observations made in British Colonies and Protectorates, etc. and Summarised in the Annual Reports of the Colonial Governments,**" Great Britain. Meteorological Office, M.O.M. 150/1939–1947, Pub. 1952, states: "Regular meteorological observations have been made for many years past in the British Colonies and Protectorates, and since 1907, summaries of these observations, on a form drawn up in the Meteorological Office, have been included in the Annual Reports of the Colonial Governments. Reprints of these tables have been forwarded to the Meteorological Office for distribution, since 1910. World War II interrupted the printing of the Annual Reports of the Colonial Governments, but manuscript copies of the meteorological tables are available in the Library of the Meteorological Office. Dates of suspension and resumption of the reprints vary from colony to colony." **"Blue Books"** and **"Annual Reports of Colonial Governments"** which are treated as separate titles in **Serial Publications of Foreign Governments** and in many libraries, are sources of these titles and data, presumably as distributed by the Met. Office, London, or summaries of them. *Subject Headings:* **1. Annual meteorological reports 2. Climatic data summaries 3. British Colonies 4. Great Britain. Meteorological Office.**—*D.M.G.*

7.7–3 551.556.3:061.3

National Research Council of Canada, **Technical papers presented to the Wind Power Working Party** [**of the Organization for European Economic Cooperation, Committee for Productivity and Applied Research.**] London, H.M. Stationery Office, **1954?** 435 p. num-

erous figs., tables, eqs., refs. **DWB**—A volume devoted to 45 technical papers presented the various meetings of the Wind Power Group of the Committee for Productivity and Appl Research of the Organization for European Economic Cooperation. The group met in Pa in April 1950, April 1951 and March 1952 and in London in Nov. 1950. Sixteen coun were present at the London meeting. Results have been achieved along lines of (a) Int national collaboration, (b) Cooperative research, (c) Wind regime studies, (d) Economic wind power, (e) Large scale developments, (f) Preparation of technical papers, (g) Bibliogra of wind power, (h) Glossary of wind power, etc. The technical papers will be abstrac separately. They are grouped according to the following categories: 1) Economy and p tentialities of wind power; 2) Wind regime studies; 3) Selection of wind power sites; 4) Wi measurements and instruments; 5) Design and testing of prototype machines. Articles a supported by numerous designs, graphs, charts, photos, tables, etc. illustrating the ins ments, equipment, most favorable sites and efficiency of various sites in France, Engla Germany, Greece, Italy, Denmark, Ireland, Scotland, India and New Zealand. For auth and titles of individual papers, *see* 6(6):898, June 1955, *MAB*. *Subject Headings:* **1. Wi power research 2. Europe. I. Organization for European Economic Cooperation. Co mittee for Productivity and Applied Research.**—*M.R.*

TEXTBOOKS AND POPULAR SCIENCE BOOKS

See also: **Hydrolog. textbooks** (Linsley, Franzini), 7.7–5.

7.7–4 551.579.4(

†Hoyt, William Glenn and Langbein, Walter B., **Floods.** Princeton, N. J., Princeton Un Press, **1955.** 469 p. 9 tables, 50 figs., 31 photos., bibliog. p. 433–443. **Floods, by strea** p. 413–431. **DWB**—A readable but thoroughly technical text covering flood proble especially those affecting the U. S. Rainstorms, thunderstorms, hurricanes, extreme ra falls, snow and ice jams are discussed in Ch. 2 (p. 12–34). Life history of floods, flood quency and measurement of floods are found in Ch. 3, Flood damage in Ch. 4, and a cata of floods before and since 1900, and by streams, in Ch. 10. The latter chapter gives a detai description of many of the floods as well as statistics on damage, etc. The book conta numerous original charts, diagrams and nomograms and gives a thorough insight into flo forecasting techniques used in the U. S. *Subject Headings:* **1. Floods 2. Flood forecasti 3. Flood data 4. Textbooks.**—*M.R.*

7.7–5 551.579(02):6

†Linsley, Ray Keyes, Jr. and Franzini, Joseph B., **Elements of hydraulic engineerin** N. Y., McGraw-Hill, **1955.** 582 p. numerous figs., tables and bibliogs. **DWB**—A new a quite technical textbook on many aspects of engineering hydrology (descriptive hydrolog quantitative hydrology, ground water, frequency analysis in hydrology, water law, reservoi dams, spillways, open channels, pressure conduits, hydraulic equipment, economic aspec irrigation, water supply and purification, power, navigation, drainage, sewage, flood contr and lastly multiple purpose projects). Ch. 2 covers the hydrologic cycle, precipitation type measurement, snow, stream flow evaporation, transpiration; Ch. 3 runoff, rainfall-snow me relations, the unit hydrograph, flood routing; Ch. 4 ground water-precipitation relation and Ch. 5 graphical methods of compiling duration frequencies of rainfall, drought, flood etc. Soil moisture relationships are taken up in the chapter on irrigation. *Subject Heading* **1. Hydrology textbooks 2. Hydrometeorology.**—*M.R.*

7.7–6 551.46(0

Bogorov, V. G., **Okean.** [The ocean.] Moscow, Voennoe Izdat-vo, **1955.** 139 figs., photos, 18 refs. **DLC**—The present volume is a nontechnical or popular review of th basic knowledge of the oceans and seas of the world. The 6 main chapters discuss: I. E plorations and voyages; II. Geography of the seas (history, bottom of the sea, currents an basins); III. Ocean water (temperature, salinity, gas, illumination, sound and ice); IV. Wat movements (sea level, waves, currents); V. Life in the sea; and VI. Soviet seas (Arctic, Pacifi

Atlantic and Inland Seas). The many illustrations give the impression that the book is mainly devoted to marine biology, but this is not the case. However, such applications, and practical Arctic work, are stressed. *Subject Headings:* **1. Popular oceanography books 2. Oceanography 3. U.S.S.R.**—*M.R.*

7.7–7 551.46(02)

Nazarov, Vasiliĭ Stratonikovich and Muromtsev, Alekseĭ Mikhaĭlovich, **Okeanografiia. Dopushcheno v kachestve ucheb. posobiia dlia srednikh morekhodnykh uchilishch.** [Oceanography. Authorized for use as a textbook for intermediate schools of navigation.] Moscow, Morskoĭ Transport, **1954.** 165 p. 68 figs. (some fold.), 14 tables. **DLC**—The oceanographic and marine factors treated in this textbook are: ocean regions of the world, bottom topography, islands, coasts, deep water and sediments of oceans and seas, sea level, sea temperature, salinity, density, gaseous content, mixing of waters, waves, tides, currents, ice cover, miscellaneous properties of sea water; and hydrologic factors of interest to naval and marine navigation students, technical workers, and seamen training for Arctic, naval or merchant marine duties. The influence of the atmosphere on the sea, and vice versa, is kept in mind throughout. Methods of observation; instruments, the latest equipment for soundings, etc. are emphasized. *Subject Headings:* **1. Oceanography textbooks 2. Physical oceanography.** —*M.R.*

7.7–8 551.5(26)(02)

Stene, Arthur and Dannevig, Petter, **Meteorologi og oseanografi for sjøfolk.** [Meteorology and oceanography for seamen.] 9th ed. of Olaf Johnsen and Zacharias Bryn's book of the same title. Oslo, Aschehoug, **1953.** 202 p. 104 figs., 7 plates (fold.), tables, English-Norwegian glossary, p. [203–204]. **DLC**—This classical marine meteorology text has been revised and enlarged slightly over the 8th ed. (1949). It contains the elements of atmospheric physics, instrumentation, temperature, cloudiness, precipitation, wind, special winds, air masses, tropical cyclones, weather reports, map analysis forecasts, codes, optical and electrical phenomena and, finally, hydrography (oceanography), including treatment of currents, tides, oceanographic instruments, sea ice, waves, and details of seasonal weather conditions along the world's main sea routes. Finally, there is a good English-Norwegian glossary of terms used in marine meteorology. (For abstract on 8th ed., *see* 5A–43, Jan. 1954, *MAB.*) *Subject Headings:* **1. Marine meteorology textbooks 2. English-Norwegian glossary 3. Textbooks. I. Johnsen, Olaf II. Bryn, Zacharias.**—*M.R.*

MONOGRAPHS

See also: **Handbook of English Channel** (Hamburg. Deutsche Hydrogr. Inst.), 7.7–53; **North Sea Handbook, Western part** (Hamburg. Deutsches Hydrogr. Inst.), 7.7–54; **Hydrolog. data of Formosa** (Formosa. Constr. Dept.), 7.7–219; **Climate of Guatemala in relation to black flies** (Dalmat), 7.7–228; **Climate and weather in Greenland** (Rodewald), 7.7–230.

7.7–9 551.582.3(81)

*Brazil. Conselho Nacional de Geografia [and] Brazil. Servico de Meteorologia, **Atlas climatológico do Brasil.** [Climatological atlas of Brazil.] Rio de Janeiro, **1955–** Contents: Vol. 1 (in 2 parts), Serra, Adalberto, **Medias, extremos, totais.** [Means, extremes, totals.] pub. 1955. 221 charts. "Vol. 2 will comprise 200 maps of frequencies and phenomena." **DWB**—The first volume (in two parts) consists of 221 charts of mean, extreme and total temperature, precipitation, sunshine, evaporation, wind direction and speed, cloudiness, relative humidity, pressure and vapor pressure, based on records from 371 stations with periods of record up to 32 yrs. For each element there are 13 charts: one for each month and one for the year. The base map is on a scale of 1:15,000,000 and shows the essential topography. Lines are neatly and sensibly drawn in consideration of the scale used, and the density of the network. Inset charts show greater detail for the São Paulo and Rio de Janeiro areas (on a 1:7.5 million and a 1:2.5 million scale). Of course little detail is possible for the wide area of the Amazon Basin. *Subject Headings:* **1. Climatic atlas of Brazil 2. Brazil.**—*M.R.*

7.7–10 551.501.9:551.57

Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, **Richtlinien für die Errichtung Hydrologischer Stationen. Grundwasserbeobachtungsstellen und Quellen.** [Guide for establishing hydrological stations. Ground water observation stations and springs.] Its *Veröffentlichungen*, No. 15, **1954.** 73 p. 19 figs., 2 diagrs. (fold.) **DLC**—This monograph deals with the principles determining the selection of observation stations, geological prospecting of ground water levels and their mapping, and discusses the selection of permanent observation stations, the erection of observation stations including household wells, ground water observation tubes, the measurement of water content of springs and the various types of measuring devices which are illustrated by means of diagrams and which include a well pipe, a plumb line with attached electric light, a floating recording gage and a combined ground water recorder and precipitation recorder and measuring vessels for the accumulation of water in springs. Also the criteria for determining the quality of water are outlined. Sample measurements of ground water levels are presented with maps and tables. *Subject Headings:* **1. Hydrologic stations 2. Ground water research 3. Hydrologic instruments 4. Hydrologic measurements.**—*I.L.D.*

7.7–11 551.582(26

*†Ferreira, Herculano Amorim (*Met. Serv. of Portugal*), **O clima de Portugal, Fasc. 8, Açores-Madeira.** [Climate of Portugal, Pt. 8, the Azores and Madeira.] Lisbon, Serviço Meteorológico Nacional, **1955.** 64 p. 10 figs., 24 tables, bibliographic refs. in text (esp. p. 8–10). **DWB**—This monograph on the climate of the Azores and Madeira contains the following descriptive text: descriptions of the physical geography of the Azores and Madeira Archipelagoes, an account of the history of meteorological observations in these islands since 186- types of climatological observations recorded and location of recording stations, the extent of the climatic data upon which climatic maps are based, isobaric conditions, air masses and fronts involved in weather formation in the Madeira and Azores Archipelagoes, cosmic and geographic factors influencing meteorological conditions, the synoptic and dynamic climatology of the Azores and Madeira and climatic classifications of these areas according to the KÖPPEN system. In addition, climatic summaries for the various weather stations and rainfall summaries for precipitation stations, maps and synoptic charts are presented. (For Pt. 1–5, see 1–128, Jan. 1950, *MAB.*) *Subject Headings:* **1. Climate of the Azores 2. Climate of Madeira 3. Azores 4. Madeira.**—*I.L.D.*

7.7–12 551.594.7:621.3

Cowan, Leslie W., **Forecasting refractive index profiles in the atmosphere.** *U. S. Air Force. 3rd Weather Group, Ent Air Force Base, Colorado Springs, Technical Paper*, No. Sept. **1953.** 80 p. 51 figs., 7 tables, 15 refs., 2 eqs. **DWB**—Meteorological factors affecting radar propagation in the troposphere are analyzed and methods of forecasting refractive indexes or superrefraction (or the opposite) conditions set forth. Seasonal air mass and regional variations in nonstandard conditions are treated in detail with profiles, tables, schematic diagrams, nomograms, etc. Limitations of radiosonde observations and effects of radiation or of sea or lake surface in modifying conditions are emphasized. Radio climatological (inversion frequency) data for cities in the U. S. and for the W. Atlantic are included in charts and frequency diagrams. *Subject Headings:* **1. Refractive index forecasting 2. Radio climatology 3. Tropospheric propagation 4. U. S.**—*M.R.*

7.7–13 551.594.7:551.510.52 551.594.7:621.3

Cowan, Leslie W., **Interpreting refractive index profiles in terms of radar coverage.** *U. S. Air Force. 3rd Weather Group, Ent Air Force Base, Colorado Springs, Technical Paper* No. 3, Oct. **1953.** 99 p. 13 figs., 61 cases, table, 6 refs. **DWB**—A manual giving information and nomograms necessary for calculating refractive index profiles, radio holes and other radio parameters involved in tropospheric propagation with transmitters 2000′, 1000′ above and base of layer, or 500′ or 1000′ below layer or in surface duct, and for different thicknesses of layer (50′ to 1000′). Special cases of a radar on a coastal peak 3000′ above the sea, and with targets 10,000′ and 20,000′ above transmitter, are considered. *Subject Headings:* **1. Tropospheric propagation 2. Refractive index profiles 3. Radio transmission ducts 4. Radio holes**—*M.R.*

7.7–14 551.577:551.579.4

*U. S. Weather Bureau, **Floods of 1952. Upper Mississippi-Missouri-Red River of the orth.** Prepared by Hydrologic Services Division. *U. S. Weather Bureau, Technical Paper*, o. 23, June **1954.** 93 p. 16 figs., 23 photos, 12 tables, map (fold. in pocket). **DLC, DWB**—he data presented in this report are as follows: a summary of precipitation in the area under nsideration by months for the period Nov. 1951–March 1952 by state divisions and the onthly and seasonal departures from normal; similar data for April 1952; monthly precipitaon data for the same period for individual points; total winter precipitation in the form of ohyets; water equivalent of snow in map form; daily meteorological data related to the elting of heavy snow cover; daily maximum and minimum temperatures for March and pril 1951 and 1952; dates of freezing and breakup of the main rivers for the period of record selected points; daily river stages for April and March, or April and May 1952; flood damage atistics, etc. A description of the basin and of the 1952 floods, of the flood damage and ood scenes (shown on photographs) are included. *Subject Headings:* **1. Precipitation data . Floods—Upper Mississippi Basin—1952 3. Mississippi-Missouri Basin.**—*I.L.D.*

7.7–15 551.521.61:535.34

*†Howard, John Nelson; Burch, Darrell E. and Williams, Dudley, **Near-infrared transmission through synthetic atmospheres.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Paper*, No. 40, Nov. **1955.** 244 p. 87 figs., 26 tables, 103 refs., eqs. **DLC.** Also issued as: Ohio State Univ. Research Foundation, Contract AF 19(604)-516, cientific Report, No. 1, Dec. **1954.** 244 p. 87 figs. (incl. photos), 26 tables, 103 refs., eqs. **DWB**—This voluminous report gives the results of numerous laboratory measurements of bsorption spectra under controlled pressure, temperature, etc. for infrared (CO_2 and H_2O) in –5μ bands. It includes discussion and illustration of equipment, calibration and correction, nd application of theoretical absorption band models to experimental data. The development of theory by LAMBERT, BEAR, ÅNGSTRÖM, LORENTZ, FOWLE, etc. in early years and GOODY, CURTIS, ELSASSER, KING, PLASS, STRONG and others in recent years is fully treated vith excellent annotation (in bibliog.). Data from this study and from other experimental nd theoretical models are presented *in extenso*. Overlapping of CO_2 and H_2O bands, pressure roadening and temperature effects are given special emphasis. Transmission through blique atmosphere is also considered. *Subject Headings:* **1. Infrared transmission 2. Absorption spectra 3. Pressure broadening of spectral lines.**—*M.R.*

GENERAL GEOPHYSICS

7.7–16 525.3

Revelle, Roger and Munk, Walter (*both, Univ. of Calif., Scripps Inst. of Oceanog.*), **Evidence from the rotation of the earth.** *Annales de Geophysique*, Paris, 11(1):104–108, **1955.** able, 11 refs. **DLC**—Factors which affect the wobble of the earth on an annual and decadal cale, and the period of rotation of the earth on an annual, decadal and millenial scale are abulated. The order of magnitude of the changes and methods of measurement are included, nd the mechanisms discussed with great clarity. The annual wobble is caused by shifts in najor air mass centers from ocean to continent between summer and winter. Melting of ice caps affects the decadal wobble. Winds are not negligible in length of day over a year, but or a longer period, bodily and surface tides and magnetic changes are responsible or give evidence of the right order of magnitude to account for observed facts. Westward drift changes are of a reverse sign to changes in length of day. *Subject Headings:* **1. Rotation of the earth 2. Length of day 3. Air mass effects 4. Geomagnetic variations 5. Earth's wobble.** —*M.R.*

7.7–17 550.385

Slaucitajs, Leonidis, **Über die zeitlichen Störungen der magnetischen Deklination im Gebiete Nordeurasiens und Grönlands.** [Temporal disturbances in magnetic declinations n North Europe and Greenland.] *Geofisica Pura e Applicata*, Milan, 28:37–46, 1954. 7 figs., 2 tables, 6 refs. **DWB**—The 11-year, annual and daily regime of magnetic declination dis-

turbances are investigated on the basis of data obtained at Arctic (auroral zone) stations. East-West asymmetry is notable. Some stations have strong local influences. Tromsö (1930–1951) data shows (1) good correlation between solar activity (relative sunspot number) and number of hours when mean declination was >1° from normal, (2) greatest seasonal deviations in March—least in Dec. with a ratio of 6:1 and (3) maximum hourly value between 1 and 2 a.m. local time—minimum about 16 h. Polar year (1932–33) data for 6 stations (Greenland and North Atlantic Arctic) show geographical distribution of anomalies of horizontal intensity. Thule shows maximum in May and minimum in Nov. Diurnal maximum and minimum vary from point to point. *Subject Headings:* **1. Magnetic disturbances 2. Auroral zones 3. Tromsö, Norway.**—*M.R.*

7.7–18 551.501.9(09

Kozieł, Karol, **30-lecie Cieszyńskiej Stacji Meteorologicznej I rzedu i 100 lat obserwacji meteorologicznych w Cieszynie.** [Thirty years existence of the Cieszyn 1st order meteorological station and 100 years of meteorological observations in Cieszyn.] *Przeglad Meteorologiczny i Hydrologiczny*, Warsaw, 8(1):53–58, **1955.** 15 refs. **DWB**—The two anniversaries are commemorated by detailed chronological surveys of the history of meteorological observations carried out at Bofumin where the first meteorological station of the region was organized in **1854.** In 1873 it was transferred to Cieszyn (city) as a 2nd order station. The published records of observations from April 1858 were printed in *Austria Zentralanstalt für Meteorologie und Geodynamik, Jahrbüch*, Vienna 1867. From 1911 to 1924 the observations were sporadic and regular observations up to the present time were resumed Oct. 1924 and are published in the PIHM yearbooks. *Subject Headings:* **1. History of meteorological stations 2. Meteorological data 3. Poland.**—*A.M.P.*

IGY AND WMO

See also: **WMO. Agricultural Meteorology Commission, 7.7–69.**

7.7–19 550.3:061.3 551.5:061.3

Absalom, H. W. L., **International Geophysical Year.** *Meteorological Magazine*, London 85(1004):33–38, Feb. **1956.** 3 refs. **DWB**—Accounts are given of the work of the Special Committee and the plans for meteorology. The prime objective is the investigation of the large-scale physical, dynamical and thermodynamical processes of the general circulation of the atmosphere. United Kingdom participation in all branches is outlined. In the polar regions the most striking feature is the international effort for good geophysical coverage in the Antarctic. *Subject Heading:* **1. International Geophysical Year, 1957–1958.**—*C.E.P.B.*

7.7–20 550.3:061.3

Chapman, Sydney, **The International Geophysical Year, 1957–58.** *Polar Record*, 8(52):33–35, Jan. **1956. DLC**—The objectives in meteorology, geomagnetism, aurora, airglow and zodiacal light, cosmic rays, solar and ionospheric observations, glaciology, oceanography, etc. are briefly summarized. *Subject Heading:* **1. International Geophysical Year, 1957–1958.**—*C.E.P.B.*

7.7–21 527:629.13:621.396.8

Sadler, D. H., **The place of astronomy in navigation.** *Institute of Navigation, London, Journal*, 9(1):1–10, Jan. **1956.** 5 figs. **DWB**—Recent applications of astronomy to navigation include the Pfund sky compass, which uses the polarization of light by the atmosphere to indicate the position of the sun when obscured by clouds or below the horizon, and radio-astronomy. Waves from about 1 cm to 30 m are received from the sun. Radio sextants of practicable size using wave-lengths of 1.9 cm and 8.7 mm are illustrated. Lunar tracking has been accomplished experimentally. Vertical reference is possible by 3 Geiger counters receiving cosmic rays. These projects will be aided by the International Geophysical Year. *Subject Headings:* **1. Navigational astronomy 2. Radio astronomy.**—*C.E.P.B.*

EXPEDITIONS—ARCTIC RESEARCH

7.7–22 551.5:06(98)

Arctic Research Laboratory. *American Geological Institute, Wash., D. C., Geological Newsletter*, 7(3):3, Sept. **1955. DGS**—The Arctic Research Laboratory (ARL) is maintained at Point Barrow, Alaska by the University of Alaska under contract with ONR to study permafrost, periglacial geomorphology, sea and lake ice, meteorology, climatology, ecology, etc. It has 17 laboratories and can accommodate up to 60 scientists who are selected in cooperation with the Arctic Institute of North America. *Subject Headings:* **1. Arctic Research Laboratory 2. Pt. Barrow, Alaska.**—*M.R.*

7.7–23 06(98)

Baird, P. D., **The Arctic Institute of North America.** *Polar Record*, 8(52):22–23, Jan. **1956. DLC**—Describes the growth and work of the Institute, established in 1945 and now having a membership of over 2000. *Subject Heading:* **1. Arctic Institute of North America.** —*C.E.P.B.*

7.7–24 551.501.9(98)

Buel, Meredith S., **Summer trip to the Arctic.** *Star Pictorial Magazine*, Washington, D. C., July 11, **1954.** p. 1, 4. illus. **DWB**—A popular illustrated account of the group of 4 U. S. Weather Bureau men led by J. Glenn Dyer of Chevy Chase, Md., who will make a 2600 mi trip to inspect and supply the Arctic stations in the Canadian Archipelago and Greenland, or make studies which will result in better conditions or more efficient operation of these stations. *Subject Headings:* **1. Arctic weather stations 2. Canadian Archipelago. I. Dyer, J. Glenn.**—*M.R.*

7.7–25 91.04(09, 98)

Centiewicz, Alina and Centkiewicz, Czeslaw, **Na podbój Arktyki.** [Arctic regions.] Warsaw, Czytelnik, **1953.** 2 v. illus. **DLC**—Volume one of this work is a historical outline of the consecutive phases of exploration of the Arctic beginning with the discovery of Iceland and Greenland, the vain search for the Northwest and Northeast Passages, the first Russian discoveries in the Far North to the de Long, Nansen, Peary, Amundsen and Sedov expeditions and, finally, to the successful voyage of the ship "Sibiriakov" from Murmansk to the Bering Strait and the tragic story of the ice-breaker "Cheliuskin" caught in the drifting Arctic ice, its sinking under the pressure of ice and the rescue of the crew by Arctic fliers. *Subject Headings:* **1. Arctic exploration 2. Arctic regions.**—*A.M.P.*

7.7–26 91.04(987)

†Hattersley-Smith, G. et al., **Northern Ellesmere Island, 1953 and 1954.** *Arctic*, Montreal, 8(1):3–36, Winter **1955.** 19 figs. (all photos), 22 refs. **DLC**—A history of visits to Ellesmere Island since 1876 and a description of the expeditions of 1953 and 1954 conducted under the leadership of the author are presented. In addition to detailed accounts of the **Geological studies** by G. Hattersley-Smith and **Geological observations 1954** by R. L. Christie, there is a report on **Geophysical and oceanographic studies** by A. P. Crary. These included a survey of the ice shelf observations, of ocean temperatures, salinity determinations, seismic studies, tide-crack physics, ice temperature and weather observations. A map of northern Ellesmere showing the routes of 1953 and 1954 expeditions and photographs showing the terraces, the ice shelf, glacier and the tide-crack system, etc. are presented. *Subject Headings:* **1. Arctic expeditions 2. Oceanographic observations 3. Arctic sea ice 4. Ellesmere Island.** —*I.L.D.*

7.7–27 551.5:551.311.184(268)

Rodahl, Kaare, **Ice islands in the Arctic.** *Scientific American*, 191(6):40–45, Dec. **1954.** illus. **DLC**—An account of the discovery of the ice islands, their origin, the first occupation of T-3 and of some of the geophysical and meteorological researches carried out. The investigations covered thickness of the islands, ocean and air temperatures and animal and plant life and the possibilities of human survival on ice islands. *Subject Headings:* **1. Arctic ice islands 2. Arctic Ice Island (T-3) 3. Meteorological research 4. Arctic.**—*I.L.D.*

7.7–28 551.509:551.311.184(2

Soviet drifting stations in the Arctic Ocean, 1955. *Polar Record*, 8(52):27–28, Jan. 19 map. **DLC**—From *Vodnyy Transport*, 1955. Two stations SP-3 and SP-4 were establis on the ice in April 1954, and relieved in 1955, when SP-5 was established in 82°4′N, 157°E. drift of 5 Soviet stations is mapped. *Subject Headings:* **1. Arctic ice stations 2. Soviet floe stations 3. Arctic Ocean.**—*C.E.P.B.*

SOCIETIES—CONFERENCES

7.7–29 91:061.3 551.311 551.46(268) 551.5(

Grigoryev, A. A., **The state of Soviet geography.** *Geographical Journal*, London, 121(429–439, Dec. **1955. DWB**—Review of the work of the past 7 years described at the U.S.S Geographical Society Congress of 1955. Among the papers some dealt with depth surv of Arctic Ocean, ice drift and sea temperature. On land, changes in the Amu-Darya (A. Kes) and studies on the humidity of Eurasia (A. V. Shnitnikov) provide information desiccation and rainy periods. M. I. Budyko studied the radiation balance. G. P. Grich described geographical zones in the Pleistocene of Eurasia. O. A. Drozdov on the moistu cycle examined relation between precipitation due to advection and that due to local conv tion. Other papers dealt with agriculture and cartography. *Subject Headings:* **1. Geograp of U.S.S.R. 2. Meteorological research 3. Geographical congresses 4. Arctic Oce 5. U.S.S.R.**—*C.E.P.B.*

7.7–30 551.5:06(4

Scherhag, Richard, **Eröffnungsansprache des 1. Vorsitzenden des Zweigvereins B Kissingen der Deutschen Meteorologischen Gesellschaft.** [Opening address of the fi chairman of the Bad Kissingen Branch of the German Meteorological Society.] *Berl Freie Universität. Institut für Meteorologie und Geophysik, Meteorologische Abhandlung* 2(3):1–8, **1954. DWB**—In this address the author lists by name various guests from abro as well as from Germany attending the meeting and the names of meteorologists who di during the previous year and outlines briefly the history of the meetings of the German M teorological Society held in Berlin. *Subject Headings:* **1. German Meteorological Socie 2. Meteorological conferences 3. Bad Kissingen, Germany.**—*I.L.D.*

7.7–31 551.1:526.98:001.4 551.48:526.98:001

Kołodziejczyk, H., **Zjazd w Krakowie pośwęcony mapom Polski: geomorfologiczne** [Krakow meeting on geomorphological and hydrographic maps of Poland.] *Przegląd M teorologiczny i Hydrologiczny*, Warsaw, 8(1):91–92, **1955. DWB**—Minutes of a meeting calle at Krakow on April 25–28, 1954 by the Polish Institute of Geography for discussion of pr liminary results of investigations already completed, as well as for the selection of unifor terminology for geomorphological and hydrographic maps of Poland compiled by the ge graphical departments of various universities under the supervision of the Institute of Geog raphy. *Subject Headings:* **1. Geomorphological maps 2. Hydrographic maps 3. Term nology 4. Poland.**—*A.M.P.*

7.7–32 551.5(234.3):061

Lauscher, F., **Wissenschaftlicher Bericht über die dritte Intern. Tagung für alpine Me teorologie in Davos-Platz, Schweiz, vom 12. bis 14. April 1954.** [Scientific report on the Thir International Conference on Alpine Meteorology at Davos-Platz, Switzerland, April 12–14 1954.] *Wetter und Leben*, Vienna, 6(10/12):187–211, 1954. **DWB**—The conference deal with the following fields of meteorology: weather relations and climatology, special mountai meteorology, atmospheric electricity, precipitation, snow cover and glaciology, runoff an avalanches, radiation, agricultural climatology and bioclimatology. Summaries of the paper delivered at the conference are presented. *Subject Headings:* **1. International Conference o Alpine Meteorology, April 12–14, 1954 2. Mountain meteorology 3. Davos-Platz, Switzer land.**—*I.L.D.*

7.7–33 551.5:551.43 551.578.46

Rikhter, G. D., **Nauchnaia sessiia Akademii Nauk Gruzinskoĭ SSR po voprosam gornoĭ meteorologii.** [Scientific session of the Academy of Sciences of the Georgian SSSR on problems of mountain meteorology.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.*, No. 1:93–94, Jan./Feb. **1954. DLC**—The reports delivered at the joint session of the Institutes of Geography and Geophysics (May 15–17, 1953) dealt with problems of mountain meteorology, the study of snow cover in mountains and the development of avalanches. The peculiarity of meteorological conditions in mountain regions and the influence of relief on incoming and outgoing radiation and the state of the air mass is such that unusual local meteorological situations are created. These should be studied in regard to their genesis, mechanism, distribution and variation. The reports on the study of snow cover embrace the problem of physical properties of snow made under actual conditions and in a special snow physics laboratory. The resistance of snow to compaction and frictional stresses is important in the formation of snow slides. *Subject Headings:* **1. Mountain meteorology 2. Snow cover research 3. Avalanches 4. Georgian SSR. Acad. of Sciences.**—*A.M.P.*

7.7–34 551.5:061.3

Solov'ev, V. A., **Itogovaia sessiia Glavnoĭ Geofizicheskoĭ Observatorii im. A. I. Voeĭkova.** [Concluding session of the A. I. Voeĭkov Central Geophysical Observatory.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:64–66, May/June **1955. DWB**—A list of the subjects of discussion, participants in the final session of the Voeikov Leningrad Central Geophysical Observatory and summaries of the subjects discussed. The session covered theoretical and experimental studies of radiation balance, theoretical and experimental studies of meteorological processes in the lower layers of the atmosphere and climatological investigations. *Subject Headings:* **1. Meteorological conferences 2. Leningrad Central Geophysical Observatory.**—*I.L.D.*

7.7–35 551.5:6:061.3

Schnelle, F., **Internationale Tagung für angewandte Meteorologie in Obertraun vom 19. bis 21. Sept. 1955.** [International Conference on Applied Meteorology in Obertraun, Sept. 19–21, 1955.] *Meteorologische Rundschau*, 9(1/2):26–27, Jan./Feb. **1956. DWB**—The Congress was organized by the Austrian Meteorological Society and attended by 100 meteorologists from 12 countries. The great variety of subjects discussed are listed. *Subject Headings:* **1. International Conference on Applied Meteorology 2. Applied meteorology 3. Austrian Meteorological Society.**—*C.E.P.B.*

7.7–36 551.5:061.2(45)

La Terza Assemblea Generale della Società Italiana di Geofisica e Meteorologia, Genova, 15–17 Aprile 1955. [The Third General Assembly of the Italian Meteorological and Geophysical Society, Genoa, April 15–17, 1955.] *Geofisica e Meteorologia*, Genoa, 3(3):39–40, May/June **1955. DWB**—Lists titles of scientific papers given at this meeting with the names of their authors. *Subject Headings:* **1. Italian Society of Geophics and Meteorology 2. Conferences 3. Genoa, Italy.**—*I.L.D.*

BIOGRAPHY, EDUCATION AND HISTORY

EDUCATION

7.7–37 551.46:026

Leipper, Dale F. (*Texas A. & M., Dept. of Oceanog.*), **Oceanography and the special library.** *Texas Agricultural and Mechanical College. Dept. of Oceanography, Collected Reprints in Oceanography and Meteorology*, No. 1/30, **1950/1954**:115–119. **DWB.** Reprint from *Special Libraries Association, Texas Chapter, Bulletin* (1952?).—Value of special oceanographic libraries to research in oceanography is stressed. Existing libraries such as those at La Jolla, Calif.; the Univ. of Washington, Seattle; Woods Hole, Mass.; the U. S. Navy Hydrographic Office, etc. are mentioned. New libraries being established in Florida, Texas and at Annapolis, Md. (Johns Hopkins) are also listed. Difficulties of classification, collection, isolation of

laboratories and establishing new libraries are noted. Finally, the Texas A & M libraries ar the research work of the Oceanography Dept. in Gulf Coast oceanography are discusse *Subject Headings:* **1. Oceanographic libraries 2. Texas A. & M. Dept. of Oceanograph** —*M.R.*

7.7–38 551.5:37

Nikulin, P. I., **Podderzhat' tsennuiu initsiativu shkol.** [In support of the valuab initiative of the schools.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:44, Jan/.Feb., 195 **DWB**—The inclusion of regional climatology in the geography courses of the secondary schoo is proposed. Training in making meteorological observations, visits to weather station talks by weather station personnel in schools, field work by students, etc. are some of the pr posals of the author. *Subject Headings:* **1. Teaching of meteorology 2. U.S.S.R.**—*I.L.D.*

7.7–39 551.5:6:0

Reichelderfer, Francis W. (*Chief, U. S. W. B., Wash., D. C.*), **Career opportunities in th United States Weather Bureau.** *Weatherwise*, 6(5):119, 142, 150, Oct. **1953. DWB**—Th wide range of geographical and subject fields open to professional and sub-professional me teorologists in the U. S. Weather Bureau and the varied duties in the service of aviatio forestry, horticulture, commerce, etc., the climatological and hydrological services, the trainin programs and educational requirements as well as opportunities for advancement are de scribed. *Subject Headings:* **1. Careers in meteorology 2. Meteorological services 3. U. S Weather Bureau.**—*M.R.*

7.7–40 551.5:3

Saucier, Walter J., **Curriculum differences in meteorological education (A reply).** *Amer can Meteorological Society, Bulletin*, 34(5):222–223, May **1953.** Beck, Niels C., **Reply.** *Ibid* 223–224. **DWB**—Critical comments on the article by BECK in the *A.M.S. Bull.*, Dec. 195 (*see item* 4.10–26, Oct. 1953, *MAB*). *Subject Headings:* **1. Teaching of meteorology 2. Me teorological curricula. I. Beck, Niels C.**—*I.L.D.*

7.7–41 551.5:373.6

Stein, Walter, **Die Wetterkunde im Seefahrtschul-Unterricht.** [Meteorology in the school of navigation.] *Annalen der Meteorologie*, 7(1/2):67–72, **1955/56. DWB**—Officers o the merchant marine must learn to navigate meteorologically. Their theoretical and practica training is enthusiastically described. *Subject Heading:* **1. Training in meteorology for sailors** —*C.E.P.B.*

BIOGRAPHY

See also: **Voeĭkov—founder of Russian climatology** (Grushko), 7.7–246.

7.7–42 551.5(26):92

Retirement of Cmdr. C. H. Williams, R.D., R.N.R., *Meteorological Magazine*, London, 85(1003):26, Jan. **1956. DWB**—Born 1892. Port Meteorological Officer in London since 1930, retired July 16, 1955. *Subject Headings:* **1. Biography 2. Williams, C. H.**—*C.E.P.B.*

7.7–43 551.5:92

Schreiber, K., **Zum Gedenken an Robert Wenger.** [In memory of R. Wenger.] *Meteorologische Rundschau*, 8(11/12):204, Nov./Dec. **1955. DLC**—Born Feb. 1, 1886, died Jan. 20, 1922. Associated with and succeeded (in 1917) V. BJERKNES at the Leipzig Geophysical Institute. *Subject Headings:* **1. Biography 2. Wenger, R.**—*C.E.P.B.*

7.7–44 551.5:92:012

†Kopcewicz, Teodor, **50-lecie pracy naukowej A. B. Dobrowolskiego.** [The 50th anniversary (Jubilee) of A. B. Dobrowolski's scientific activity.] *Acta Geophysica Polonica*, Warsaw, 2(3):115–123, **1954.** 4 foot-refs. English summary p. 122–123. List of 25 of DOBROWOLSKI's publications, 1902–1951, p. 120-121. **DLC**—Some details on the most significant events of the scientific activity of the late Polish explorer, meteorologist, former director of the State Meteorological Institute and of the Aerological Marine and Geophysical Observatories. A review of DOBROWOLSKI's most important works is presented. A list of 25

publications on questions related to geophysics is included. (*See also* 7.4–36, April 1956, *MAB.*) *Subject Headings:* **1. Author bibliographies 2. Bibliography of A. B. Dobrowolski 3. Dobrowolski, A. B.**—*A.M.P.*

7.7–45 551.5:92

Keil, Karl, **Hermann Elias** [Obituary]. *Meteorologische Rundschau*, Berlin, 9(1/2):1, Jan./Feb. **1956. DWB**—Died Nov. 10, 1955, aged 79. From April 1, 1899–end of 1904 assistant in Aeronautical Section of Prussian Meteorological Institute. In 1908 he took part in BERSON's aeronautical expedition to East Africa. After 1918 joined the publishing house of his father-in-law, supervising a number of aeronautical works. *Subject Headings:* **1. Obituaries 2. Elias, H.**—*C.E.P.B.*

7.7–46 551.5:92

Novozhilov, N. I., **Raboty N.A. Morozova v oblasti meteorologii.** [Works of N. A. Morozov in meteorology.] *Priroda*, Moscow, 43(10):79–82, Oct. **1954.** 2 refs. **DLC**—A review of the meteorological contributions of N. A. MOROZOV on the occasion of his one-hundredth anniversary. In 1910 he utilized captive balloons and airplanes for studies of the free atmosphere. His works include studies on the structure of cumulus and thunderclouds, the development of clouds and on the use of diffraction phenomena for determining the size of cloud droplets, etc. *Subject Headings:* **1. Biography 2. Morozov, N. A.**—*I.L.D.*

BIBLIOGRAPHY

See also: **Bibliog. of A. B. Dobrowolski** (Kopcewicz), 7.7–44; **Turbulence bibliogs.** (Dryden), 7.7–175; **Development of physical geography in Poland** (Galon), 7.7–224.

7.7–47 551.5:015:016

†France. Météorologie Nationale, **Publications de la Météorologie Nationale.** Sept. **1954.** 7 p. **DWB**—A list of (1) 40 Memoirs (1923–1954) and the price of each; (2) a Lexique in 7 parts (1926–31); (3) Bibliographie Météoroligie Internationale (1921–1951); (4) text-books and manuals (9 titles); and (5) annual bulletins (1946–1949). *Subject Headings:* **1. Publication lists 2. French Meteorological Service publications 3. Bibliography of French meteorological literature.**—*M.R.*

7.7–48 551.578.4:016:495.6

†**Researches on Snow and Ice.** Tokyo, No. 1, Oct. **1953.** 242 p. In Japanese. Contents, back cover-title, and many legends in English. Bibliographic citations in original language. Issued by the Japanese Society of Snow and Ice, with offices in Government Forest Experiment Station, Meguro, Tokyo. **DWB**—Thirty-three papers, all in Japanese, on snow research, theoretical and applied, such as speed and size of falling snowflakes, icing of wires, snow accretion on cables, forecasting snow accretion, sleet-jump on electric wires, snow caps, cornices, and deposits; surveys and literature reviews. *Subject Headings:* **1. Snow research 2. Industrial meteorology 3. Snow and ice research bibliographies 4. Japanese language.**—*M.R.*

TERMINOLOGY—DEFINITIONS

See also: **Storm tide research** (Reid), 7.7–60; **Climatology** (Rein), 7.7–227.

7.7–49 551.5:408.92

Ockenden, C. V., **Use of Esperanto by meteorologists.** *Meteorological Magazine*, London, 85(1004):56–57, Feb. **1956. DWB**—Calls attention to a UNESCO resolution advocating the use of Esperanto and urges that WMO. should foster it in meteorology. *Subject Heading:* **1. Esperanto in meteorology.**—*C.E.P.B.*

7.7–50 551.5:001:413:629

Layton, C. W. T., **Dictionary of nautical words and terms. 8,000 definitions in navigation, seamanship, rigging, meteorology, astronomy, naval architecture, average, ship economics, hydrography, cargo stowage, marine engineering, ice terminology, buoyage, etc.** Glasgow,

Brown and Ferguson, **1955.** 413 p. Price: 25s/—. **DLC**—*Subject Headings:* **1. Naut dictionaries 2. Navigation 3. Terminology.**

7.7–51 551.5:001:

Battioni Chiarino, J. A., **Definición y descripción de meteoros.** [Definition and descri tion of hydrometeors.] *Revista Meteorológica,* Montevideo, 13(48):25–36, June **1955.** "S tion from a Manual of Instructions pub. by the Meteorological Service of Uruguay." **MH-** —Definitions and descriptions are given of all forms of hydrometeors—rain, snow, hail, e mist, dew and ice deposits, blizzard, spume, tornado. Then follow accounts of halo p nomena, rainbows, corona, iridescent clouds, glories, lightning, thunder and St. Elmo's f *Subject Headings:* **1. Hydrometeors 2. Definitions 3. Spanish language.**—*C.E.P.B.*

7.7–52 551.58:

Wagner, Richárd, **Az éghajlat fogalmáról.** [Definition of climate.] *Időjárás,* Budape 59(1):42–44, Jan./Feb. **1955. DLC.** Also: Berkes, Zoltán, **Az éghajlat fogalmának megh ározásáról.** [Definition of the term *climate.*] *Ibid.,* 59(1):44–45, Jan./Feb. **1955. DLC** 1) The earth, solar radiation and the atmosphere are named as the basic climatic fact According to the author's definition: "Climate is the process of rhythmic, periodical chan in the atmosphere modified by environment." 2) Climate is defined as "the totality of physic geographical (or geophysical) factors determining the possible weather development ove given region." Such factors are: radiation balance, orography, general circulation (advecti and atmospheric composition. Climate may be characterized, but not defined, as the total of weather occurrences in a given region. *Subject Headings:* **1. Climate 2. Definitions.**—*G*

APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **The ocean** (Bogorov), 7.7–6; **Oceanography** (Nazarov), 7.7–7; **Met. and oceanog. for seaman** (Stene, Dannevig), 7.7–8; **Oceanog. and special library** (Leipper), 7.7–37; **Met. in navigation schools** (Stein), 7.7–41; **Navigation** (Layton), 7.7–50; **Surface temp. & salinity records, Finland** (Granqvist); 7.7–167; **Water mass separation** (Nagai), 7.7–168.

7.7–53 551.582:656.61(261.

§*Hamburg. Deutsches Hydrographisches Institut, **Handbuch des Kanals, I Teil, D Südküste Englands.** [Handbook of the English Channel, Pt. 1, The south coast of Englan 6th ed. Berlin, Mittler, **1934.** 402 p. 145 figs. Its *No.* 2017. At head of title-pag Marineleitung. Also: 7th ed. Its *No.* 2017, **1954.** 447 p. 109 figs., 31 charts. In pock [of 7th ed]: **Klima und Wetter, bearbeitet vom Deutschen Wetterdienst-Seewetteramt, Ha burg. Sonderdruck aus Handbuch des Kanals, Teil 1, 7th ed. 1954.** [Climate and weath prepared by Deutscher Wetterdienst, Seewetteramt, Hamburg. Supplement to Handboo . . .] Hamburg, **1954. DWB**—Discussion on p. 33–45 (6th ed.) of wind, fog, precipitatio temperature, thunder, cyclones, weather and synoptic conditions along English Chann coast of England, with illustrated synoptic charts and tabular data, frequencies, etc. for number of stations (Scilly, Dungeness, Southampton, etc.) % frequencies of wind to 8 dire tions at Scilly, St. Matthew and St. Honorien du Fay. *Subject Headings:* **1. Coastal pilo 2. Marine** climatology **3. Climate of English Channel 4. English Channel Coast.**—*M.R.*

7.7–54 551.582:656.61(261.2:41

Hamburg. Deutsches Hydrographisches Institut, **Nordsee-Handbuch. Westlicher Te Die Ostküsten Schottlands und Englands vom Pentland Firth bis Cromer, 1954.** [Nor Sea Handbook, Western Part. East coast of Scotland and England from Pentland Firth Cromer, 1954.] 7th ed. Hamburg, **1954.** 393 p. 117 figs., charts, tables. Its *No.* 200 **DWB**—Information on the climate of the western part of North Sea is presented in Pt. p. 51–58. It deals with: 1) Air pressure (p. 51–52), contains a table showing the month and yearly means of pressure at Wick, Shields and Yarmouth and 2 charts of mean air pressu distribution over Central and Northern Europe (period 1874–1933); 2) Winds (p. 51, 52–5

a table showing the frequency (in %) of wind directions by months in the 3 regions of the sea and a table of mean monthly wind force (Beaufort scale); 3) Storms (p. 55–56) with a table of monthly frequencies of strong winds and storms for the 3 sea regions; 4) Air temperature (p. 56), table of monthly and annual means for the 3 regions and above mentioned localities; 5) Cloudiness (p. 50–51), table of monthly and yearly means (in tenths of the sky canopy); 6) Precipitation, 2 tables showing mean monthly and yearly amount of precipitation and mean number of rainy days; 7) Fogs (p. 51–58), besides general information contains 2 tables—one showing mean monthly frequency of fogs and the other mean number of foggy days by seasons for 5 localities. *Subject Headings:* **1. Sailing directions 2. Climate of North Sea 3. North Sea.**—*A.M.P.*

7.7–55 551.556:551.465

Fedorov, K. N., **Vetrovye techeniia v more peremennoĭ glubiny.** [Wind currents in a sea of variable depth.] *Akademiia Nauk SSSR, Izvestiia Ser. Geofiz.*, No. 3:223–233, **1955.** 7 figs., table, 6 refs., 29 eqs. **DLC**—A method is developed for calculating the currents and positions of the level in a mean cross section of a homogeneous sea of elongated form and variable depth. The deflection action of the earth's rotation is taken into account. The application of this method is illustrated by a numerical example. The effect of the Coriolis force upon currents produced by wind is investigated. *Subject Headings:* **1. Wind currents 2. Wind current calculations.**—*Trans. of author's abstract.*

7.7–56 551.556:551.465

Kajiura, K. (*Geoph. Inst., Tokyo Univ.*), **Velocity distribution of wind currents in the eastern part of the equatorial Pacific.** *Tokyo. Univ. Geophysical Institute, Geophysical Notes*, 5(24), Contribution No. 25, **1952.** [8] p. 3 figs., 6 refs., 13 eqs. **DWB.** Also issued as *Oceanographical Society of Japan, Journal*, 8(1):15–22, **1952.**—Wind driven currents in a baroclinic ocean are discussed following the ideas of SVERDRUP and REID, and the current velocities in the upper layers of the eastern equatorial Pacific are calculated on the assumption that the inertial forces and the lateral friction are negligible. According to the present theory, currents may be divided into two parts, of which one is the pure drift current and the other is the relative current, and it is found that the results are in good agreement with the present knowledge of the currents near the equator. In these regions, the relative currents are much stronger than the pure drift currents and the north-south component of the velocity is very small compared with the east-west component. *Subject Headings:* **1. Wind driven currents 2. Ocean currents 3. Equatorial Pacific.**—*Author's abstract.*

7.7–57 532.59:551.46

Iampol'skiĭ, A. D., **Ob odnoĭ kharakteristike trekhmernogo volneniia.** [One characteristic of three-dimensional wave motion.] *Priroda*, Moscow, 44(5):80–81, May **1955.** 3 figs. **DLC**—Aerial photographing of sea waves made jointly by the author (Institute of Oceanography) and the Laboratory of Aero-methods of the Academy of Sciences established an interesting dependence between the length of waves and the amplitude of wave troughs between neighboring wave crests measured perpendicularly. About 500 wave lengths and trough lengths established on each aerial photo, processed statistically, and distributed into classes are presented in a graph in which the wave lengths are plotted on the abscissa axis and the trough lengths on the ordinate. The distribution of the points show roughly the dependence between trough amplitude and wave length of equal frequency to be in direct proportion. Author adds that these results should be considered as preliminary. *Subject Headings:* **1. Ocean wave length 2. Ocean wave heights.**—*A.M.P.*

7.7–58 546.211:551.48:581.11:551.52

Sugiura, Y. (*Met. Res. Inst., Tokyo*), **On the diurnal variation of oxygen content in surface layers of the hydrosphere.** *Papers in Meteorology and Geophysics*, Tokyo, 4(2):79–89, Sept. **1953.** 7 figs., 14 refs., eqs. **MH-BH**—The mechanism of the diurnal variation of dissolved oxygen is discussed from the physico- and biochemical point of view. A theoretical, generalized formula is presented concerning oxygen content in relation to solar radiation, water temperature, number and size of living matter, etc. If the flow of water and the effect of diffusion is negligible, the formula becomes simpler. Using this simplified formula it is concluded

that minimum and maximum amounts of dissolved oxygen appear at an equal time dista before and after noon. In Tokyo the minimum should occur at 6~8h and the maximum 15~17h. The amplitude of diurnal variation is larger on a clear day than on a cloudy d it is larger in summer than in winter. The amount of oxygen production and consumpt during a day is computed for specified number and size of phytoplankton. The values ag well with those observed by E. KURASHIGE. *Subject Headings:* **1. Oxygen content of surf water 2. Phytoplankton effects 3. Water temperature effects 4. Radiation effe 5. Tokyo, Japan.**—*Author's abstract.*

7.7–59 551.556:532.593(2

Yoshida, K.; Kajiura, K. and Hidaka, K., **Preliminary report of the observation of oce waves at Hachijo Island.** *Records of Oceanographic Works in Japan*, New Ser., 1(1):81— March **1953.** 8 figs., table, 4 refs. Also issued as: *Tokyo Univ. Geophysical Institu Geophysical Notes*, 6(1) Contribution No. 1, Sept. 1953. **MH-BH**—Results of wave and w measurements made on Hachijo Island in Aug. 1951 and Oct. 1952 are reported. Discussed particular are wave refraction effects and wind stress magnitudes. *Subject Headings:* **1. Wi waves 2. Hachijo Island, Western Pacific.**—*G.T.*

7.7–60 551.515:525

Reid, Robert O. (*Physical Oceanog., Texas A. & M. College*), **Status of storm-tide resear** *Science*, Wash., D. C., 122(3178):1006–1008, Nov. 25, **1955. DLC**—A condensed article general problem of storm tides, present status and future research problems, and storm t behavior. Storm tides are defined as nonastronomical anomalies of water level that res from the winds, from abnormal atmospheric pressure, and from excessive precipitation caus by local storms, excluding ordinary wave "noise" and phenomena directly associated with su waves. Variations resulting from density and changes or redistribution of mass resulting fr large scale weather changes, or ultra-long variations, tidal waves and surf beat are also e cluded. Eleven factors are considered as important: 1) depth, 2) surrounding land (part or complete), 3) scale of storm, 4) wind velocity and variations, 5) pressure of air, 6) speed movement of storm, 7) relation between wind stress, wind speed and stability of air, 8) botto friction, 9) inertia of moving water, 10) coriolis force and 11) rainfall. *Subject Headin* **1. Storm tide research 2. Definitions.**—*M.R.*

AERONAUTICAL METEOROLOGY

See also: **Aviation climatology** (Du Jonchay, Mironovitch), 7.7–137; **New information on jet stream** (Frost), 7.7–141; **Jet stream flying** (Kuettner), 7.7–143; **Wave pattern in condensation trail** (Harper), 7.7–186; **Lee waves over Green I air route** (Chambers), 7.7–187; **Aircraft icing** (Brun), 7.7–196; **Aircraft icing** (Brun, Dorsch), 7.7–197.

7.7–61 551.506.7:551.551:551.557:629.

Chambers, E., **Clear air turbulence and civil jet operations.** *Royal Aeronautical Societ Journal*, 59:613–628, Sept. **1955.** 7 figs., 6 tables, 19 refs. **DLC, DWB**—High-level "cobbl stone" turbulence is important for comfort of airplane passengers though rarely dangerou Recent investigations are reviewed; the main deficiency is a comprehensive dynamical theor A B.E.A. investigation (1948–50) and B.O.A.C. records are analyzed. Six cases of viole turbulence are examined with 500 and 300 mb charts. Forecasting depends largely on ma ping jet streams. A number of conclusions as to location (generally near jet streams) an seasonal incidence of severe turbulence are given, and some unanswered questions pose *Subject Headings:* **1. Clear air turbulence 2. Bumpiness 3. Jet aircraft operation.**—*C.E.P.*

7.7–62 551.557:551.576.5:629.1

Frost, Bernard C. (*British Overseas Airways Corp.*), **More about the jet stream.** *Sh Aviation News*, London, No. 195:14–18, Sept. **1954.** 12 photos in color of clouds. **DWB** The meandering nature of the jet stream, the relation to temperature fields (steep gradient which help the pilot identify jet stream areas, cloud formations which are characteristic of th jet stream and the advantages which may be taken (by transoceanic pilots) through use of avoidance of jets, are vividly described and beautifully illustrated with color photos and model cross-section of a jet area. Some record W-E flights are tabulated and the winds mea

:d over Stephensville, Newfoundland on Jan. 22, 1954, of 258 kn at 20,000 ft and 328 kn ,32,000 ft are noted. (For earlier article on same subject ,*see* 5.9–203, 1954, *MAB.*) *Subject adings:* **1. Jet stream flying 2. Jet stream cloud photographs 3. Optimum flight paths Winds aloft 5. Stephensville, Newfoundland.**—*M.R.*

7.7–63 535.7

High altitude cuts vision. *Science News Letter*, 67(14):215, April 2, **1955. DLC**—The ıximum range of vision is reduced by one half when flying in an empty cloudless sky. British :dical aviation experts denote this phenomenon as "empty field myopia" caused by the sence of objects on which the eye can rest. The eye cannot focus at infinity where no distant ject is present and will be focused at a distance of about a yard instead. This is counter- ted by an optical trick giving the eye the illusion of being focused at infinity. *Subject Head- gs:* **1. Visual acuity 2. High altitude myopia.**—*W.N.*

7.7–64 551.509.58:656.7

Hille, Alfréd, **A forgalmi repülés időjárási biztonsági szolgálata.** [Weather service for mmercial airlines.] *Időjárás*, Budapest, 59(1):46–50, Jan./Feb. **1955. DLC**—The work rformed by the aviation department of the Hungarian Meteorological Institute is described. ıe Department consists of two sections, namely the Budapest center (located at Ferihegy rport) and the provincial network (with stations at commercial airports). The Budapest nter has a staff of synopticians, observers, radio operators and draftsmen. Observation, ıta collection, analysis and briefing (monitoring) are the principal duties of the center. ach of the eleven provincial airport stations is manned by three trained meteorologists who ternate on observation and flight-briefing duty in 24-hr shifts. The operations of these bservers and of the Budapest center are described in detail. *Subject Headings:* **1. Aero- ıutical meteorological services 2. Hungary.**—*G.T.*

7.7–65 551.5:629.13(261, 264)(09)

Mitchell, J. L., **The conquest of the Atlantic.** *Shell Aviation News*, London, No. 202:4–10, pril **1955. figs. DWB**—Illustrated historical account of crossings of the Atlantic by lighter- ıan-air and heavier-than-air craft during the past 35 yrs. The first crossing of the North tlantic was in 1919 by Lt. A. C. Read of the U. S. Navy, and the first non-stop (New- undland to Ireland) a month later (June 14/15, 1919). The first South Atlantic attempt as in 1922 by Gage Coutinho (Portuguese) from Lisbon to St. Pauls Island, and in 1927 Natal (3 Portuguese flyers). The first double crossing by airship was made in July 1919 the H. M. Airship R-34 under Major G. H. Scott. He used what today would be called ressure pattern flying and used ship's weather reports. Development of weather reporting ıd forecasting, weather ships (asked for in 1919), and improvements in weather aids that llowed rapidly after the phenomenal expansion in trans-Atlantic service from 1939–41 are cluded in illustrated discussion. *Subject Headings:* **1. Aeronautical meteorological services Atlantic flights 3. History of aeronautics.**—*M.R.*

7.7–66 551.574.7:629.13

Vuelo en condiciones de hielo. [Flight under icing conditions.] *Revista Meteorológica l Perú*, Lima, 1(1):49–50, Dec. **1954. DWB**—Rules for avoiding aircraft ice or static in ouds, or for minimizing danger from icing and static are given in outline form. *Subject eadings:* **1. Icing of aircraft 2. Precipitation static.**—*M.R.*

INDUSTRIAL METEOROLOGY

See also: **Applied met.** (Schnelle), 7.7–35; **High altitude cuts vision,** 7.7–63; **Climate & weather in fishing regions of W. and S. Greenland** (Rodewald), 7.7–230.

7.7–67 621.396.8:621.38

Mitra, S. K., **The story of radio-electronics.** *Journal of Scientific and Industrial Research, c. A*, New Delhi, 14(1):3–13, Jan. **1955.** 6 foot-notes (incl. 3 foot-refs.). **DWB**—This esidential address to the 42nd Session of the Indian Science Congress, Baroda, Jan. 4, 1955 ens with a brief summary of radio electronics from fundamental research to practical ap-

plications in radio climatology, radio astronomy and defense. Next part takes up In position in radio research, facilities and future. It ends with an appeal to the younger ge tion to take advantage of study facilities in the nationally important field of radio electr *Subject Headings:* **1. Radio electronics 2. Radio research.**—*W.N.*

7.7–68 551.524.3:551.571.

Weir, Charles E., **Influence of temperature and moisture on the electrical propert leather.** *U. S. National Bureau of Standards, Journal of Research,* 48(5):349–359, May 6 figs., 8 tables, 47 refs. **DLC**—Dielectric constants of chrome and vegetable leathe untanned hide show a marked relation to moisture content. Direct current resistivit creases from above 10^{16} ohm/cm dry to below 10^{9} at 30% moisture, but the relations ar sufficiently reliable for quantitative moisture analysis. *Subject Headings:* **1. Temper effects 2. Humidity effects 3. Leather.**—*C.E.P.B.*

AGRICULTURAL METEOROLOGY

See also: **Field microclimatology** (Krečmer), 7.7–69; **Weather of 1954 and Scottish farmer** (Wannop), 7.7–84; **Coffee cultivation** (Trojer), 7.7–231; **Microclimatic characteristics of drained swamps** (Gol'tsberg), 7.7–237.

7.7–69 551.5:63:

Primera Reunión de la Comisión de Meteorología Agrícola de la OMM, en París. [meeting of the Commission of Agricultural Meteorology of the World Meteorological Orga tion, in Paris.] *Meteoros,* Buenos Aires, 4(1/2):112–117, Jan./June **1954. DWB**—An acc of the proceedings of the Commission of Agricultural Meteorology. The various resolu passed, the various reports presented and the proposed activities are summarized. *Su Headings:* **1. WMO. Agricultural Meteorology Commission 2. WMO. meetings.**—*I.L.*

FOREST METEOROLOGY

See also: **Forest influences** (Kulig), 7.7–71; **Microclimatic differentiation of plant stands** (Schlüter), 7.7–241; special bibliography on **Snow micrometeorology,** p. 873.

7.7–70 551.58

†Krečmer, Vladimír, **K otâzce krycích kultur v lesnictví.** [The problem of interpla crops in forest cultures.] *Meteorologické Zprávy,* Prague, 8(1,2):22–28, 56–57, Feb. April 30, **1955.** 9 figs., 4 tables, 32 refs. Russian and German summaries p. 22. **DW** A critical review of literature and the author's own measurements in the field indicate interplanted grain crops covering an area completely may be harmful as far as soil mois and plant climate are concerned. Seedlings protected by such interplanted crops suffer damage by drying of the soil during dry periods. Certain microclimatic conditions are liable to worsen; for example the available light may decrease critically. *Subject Head* **1. Field microclimatology 2. Soil moisture deficiency 3. Forest microclimatology.**—*Tr of author's abstract.*

7.7–71 551.579.5:634.94:62

Kulig, Ludwik, **Lacy w dorzeczu gornej Wisły i przystosowania ich do celow przeciw wodziowych.** [Forests of the upper Vistula and their adaptation against flood.] *Przeg Meteorologiczny i Hydrologiczny,* Warsaw, 6(3/4):127–134, 1953. pub. **1954. DWB** discussion of the actual state of foothill and mountain forests in the Vistula River basin in Carpathian and Tatra regions. The author reviews the causes of the gradual deteriora of the quality, density, and species of the woods from the middle of the 19th century to post-war period which resulted from bad management, excessive felling and pasturing, of state supervision, pests and blights, war and German occupation. Finally, he discusses measures that should be taken in order to restore and improve the quality (more decidu species), augment the acreage and ameliorate the runoff of mountain water after snow m and rainfall. *Subject Headings:* **1. Flood protection 2. Forest influences 3. Vistula Ri Basin, Poland.**—*A.M.P.*

7.7–72 551.579.2:551.578.42(521.15)

Ishiyama, Koichi and Kadowaki, Takeo, **Snow depth in Sekizawa model forest.** *Journal Meteorological Research,* Tokyo, 6(10/11):496–501, Dec. **1954.** 8 figs. In Japanese; nglish summary p. 496. **DWB.** Also in: *Sendai, Japan. Central Meteorological Observatory, ulletin of the Meteorological Society for Research of Tohoku District,* 8(2):496–501, Jan. **1955.** figs. In Japanese; English summary p. 496.—The observations and some investigations on ıe influence of forest on snow depth are made for the period of Jan. to April, 1953, at Sekizawa, hich is situated in the eastern part of Yamagata City at a height of 600 m above sea level. he following results were obtained. 1. The accumulation season of snow depth is divided ıto two periods; one is stable and the other unstable. These are characterized by the variation snow depth by rainfall. 2. Outside the forest, the maximum of the water equivalent of ıow pack appears 10 days later than the date of maximum snow depth. This is due to the ıct that snow melt at the beginning of melting season is used only for the increase of snow ensity. 3. Relation between water equivalent of snow M(mm) and the accumulated temerature (t°C) is shown by the parabolic curve, $M = -0.114t^2+0.147t+314$. *Subject Headings:* **. Snow depth 2. Snow melt 3. Forest influences 4. Sekizawa, Japan.**—*Authors' abstract.*

7.7–73 368.10:632.187

*Countryman, C. M. and Intorf, P. H., **Fire season severity index for California national orests.** *U. S. Forest Service. California Forest & Range Experiment Station, Miscellaneous 'aper,* No. 14, Oct. 16, **1953.** 7 p. 4 tables, ref. **DWB**—Fire severity indices have been ompiled for fire danger rating areas in Northern and Southern California, for each season from 945 to 1952, and the results are tabulated to show variations from year to year or from place to lace, in order that authorities dealing with forest protection might better evaluate the effectiveess of fire control efforts which also vary. In Northern California, 1945 was the worst year; ı Southern California, 1948 with a severity index of 1.42, was the worst. It is shown that s the danger index rises, more fires tend to become larger fires. *Subject Headings:* **1. Fire everity indexes 2. Forest fires 3. California.**—*M.R.*

MEDICAL METEOROLOGY

See: **High altitude cuts vision,** 7.7–63; **Virus infections and weather** (Kaiser), 7.7–247.

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Hydrolog. stations** (Germany. Deutsche Demokr. Rep. Met. und Hydrol. Dienst), 7.7–10; **Arctic weather stations** (Buel), 7.7–24; **Snow and ice research,** 7.7–48; **Radiation measurem.** (Portman), 7.7–154; **Earth's albedo measurement** (Shackleton, Quirk), 7.7–155; **Temp. scales** (Eickermann), 7.7–165; **Evaporation estimation** (Haude), 7.7–189; **Precip. networks** (Ropes), 7.7–202; **Hydrolog. analysis** (Krol), 7.7–220; **Refractive index** (Overcash), 7.7–254; **Atmos. electricity measurem.** (Israël), 7.7–264; **Low frequency radiation from lightning** (Hill), 7.7–240; **Sferics recording methods** (Newman et al.), 7.7–272.

7.7–74 551.501:551.558

Orlova, E. M., **K voprosu o raschete vertikal'nykh skorosteĭ po dannym polia vetra.** [Calculation of vertical velocities from wind fields.] *Meteorologiia i Gidrologiia,* Leningrad, No. 1:8–15, Jan./Feb. **1955.** fig., table, 2 refs., 11 eqs. **DWB**—The author presents a simplied method for calculating the horizontal divergence of air currents necessary for computing he vertical velocity in a wind. From the equation of continuity, formulas are developed for alculating vertical velocity at different isobaric surfaces and a procedure for calculating the ind velocity over large areas with the aid of a nomogram is presented. The use of the method ı weather analysis and forecasting is discussed and illustrated. *Subject Headings:* **1. Vertical ind velocity calculation 2. Nomograms 3. Weather forecasting.**—*I.L.D.*

7.7–75 551.501.1:551.576

Williams, C. H. and Radley, J. R., **Hints on observing, Pt. 5, Clouds.** *Marine Obse* 26(171):19–25, Jan. **1956.** 5 figs. **DLC**—Brief descriptions of origin and classificatio clouds, entry in log and coding of radio messages. Hints are given on estimating cloud hei A flight forecast form showing clouds is illustrated. *Subject Headings:* **1. Instructions observers 2. Cloud observation.**—*C.E.P.B.*

7.7–76 551.501.4:551

*Crabb, George A., Jr., **Normal annual pattern of mean daily temperatures at East Lans Michigan.** *Michigan. Agricultural Experiment Station*, 36(4):401–407, May **1954.** 3 f table, 6 refs. **DLC**—Using 5 years of daily mean temperature for East Lansing, Mich., author obtained a smooth curve by using 15-day running means. This curve closely resem the normal curve obtained from 39 years of record. The same techniques and applicat were used as in previous work by the author on normal daily insolation and evaporation hydrologic studies. The curves for the three elements (insolation, evaporation and t perature) closely resemble each other, though the lag of mean temperature is about three we and that of evaporation one month behind the insolation maximum and minimum. *Su Headings:* **1. Temperature normals 2. Smoothing techniques 3. Mean diurnal temperatu 4. East Lansing, Michigan.**—*M.R.*

7.7–77 551.501.42:551.509

*§de Lisle, J. F., **Some computations of 500 mb height tendencies in the New Zealand reg** *New Zealand. Meteorological Service, Technical Note*, No. 120, March **1955.** 9 p. 9 fi 4 tables, 6 refs., 8 eqs. **DWB**—Five 500 mb barotropic tendency computations for the east Australia-New Zealand region done at 12-hourly intervals were found to give about the sa accuracy as that found in similar Northern Hemisphere calculations. The inclusion of baroclinic effect made little difference to the results. Some possible reasons for errors in computations are discussed. *Subject Headings:* **1. Barotropic tendency computation 2. Ba clinic effect 3. New Zealand 4. Australia.**—*Author's abstract.*

7.7–78 551.501.42:551.508.41 551.54

*Gödecke, K., **Praktische Methoden zur Reduktion von Luftdrucken auf Meeresniv** [and] **Barometertabellen.** [Practical methods for the reduction of atmospheric pressure sea level (and) Barometric tables.] *Germany. Deutscher Wetterdienst. Instrumentenc Nord, Hamburg, Technische Mitteilungen*, No. 25, July **1953.** 38 p. 12 tables, graph, 25 re 19 eqs. **DWB**—All the correction factors to be applied to a barometer to obtain station a sea level pressure are discussed in theory; tables of correction factors for various latitud scale and outdoor temperatures, altitudes, etc. are presented *in extenso* and a unified nomogr with curves embracing all corrections included and its use demonstrated. *Subject Headin* **1. Barometer corrections 2. Barometer reduction 3. Altimetry.**—*M.R.*

7.7–79 551.501.45:51

Kivéliovitch, M. and Vialar, J. (*both, Etablissement d'Etudes et de Recherches Met., Par* **Étude statistique des séries chronologiques.** [Statistical study of chronological serie [Pt. 1.] *Journal Scientifique de la Météorologie*, Paris, 5(17):21–46, Jan./March **1954.** figs., 4 refs. [**Pt. 2**] *Ibid.*, 5(18):75–87, April/June **1953.** eqs., figs. [**Pt. 3**] *Ibid.*, 5(1 89–101, July/Sept. **1953.** 8 figs., 3 tables. [**Pt. 4**] *Ibid.*, 5(20):129–143, Oct./Dec. 19 tables, charts. [**Pt. 5, and conclusion**] *Ibid.*, 6(21):1–16, Jan./March **1954.** tables, 6 ref eqs. **DWB**—The theory of chronological series of a discrete variable is applied to a study wind direction at four stations, viz. Algiers, LeBourget, Oslo and Zürich. The use of runni means on a chronological series (for example, of sunspots) and the meteorological applicatio of tests of probability to the height of the tropopause, winters in Western Europe, etc. a discussed with the aid of examples. *Subject Headings:* **1. Chronological series 2. Wi direction.**—*I.L.D.*

7.7–80 551.501.6:53

Crooker, A. M. and Ross, W. L., **Note on black body radiation.** *Canadian Journal Physics*, Ottawa, 33(5):257–260, May **1955.** 2 figs., 6 refs., eqs. **DWB**—A graphical meth

determining radiation rate for any arbitrary emissivity from 0.1 to 1.0, for temperatures n 400° to 4000°K, and 2 templates to facilitate computation, are described and illustrated. e radiant power values and quantum flow rates may be read on the left and righthand inates, respectively. The devices should be accurate to ≈2%. *Subject Headings:* **1. Radia- n charts 2. Black body radiation.**—*M.R.*

7.7–81 551.501.6:551.55

Georgi, J. (*Hamburg*), **Bemerkungen über Windregistrierungen und deren Auswertung.** emarks on wind records and their evaluation.] *Germany. Deutscher Wetterdienst. In- umentenamt Nord, Hamburg, Technische Mitteilungen*, No. 24, May **1953.** 15 p. 10 figs., foot-refs. **DWB**—Extensive remarks on anemometer observations in the British Zone of rmany after the war, the accuracy of measurements, wind increase with height, its depend- e on temperature gradient and on topography and, finally, several chapters on evaluation of nd records by statistical and graphical means for various purposes, including the problem of nd extremes. *Subject Headings:* **1. Wind record evaluation 2. Wind data 3. Graphical esentation.**—*M.R.*

7.7–82 551.501.7

†Defrise, Pierre, **Diagrammes aérologiques.** [Aerological diagrams.] *World Meteoro- ical Organization, OMM*, No. 35. TP. 11; *Technical Note*, No. 6, **1954.** 14 p. tables, refs. 6–7. English, Spanish and Russian summaries, preceding p. 1. **DWB**—A preliminary idy of results of questionnaires sent out by WMO Secretariat to find out what aerological agrams are in use by the various services. *Thermodynamic* diagrams are distinguished from *rological* diagrams. Replies from 53 countries are classified according to 7 categories of agrams, used throughout world. Presentations in 2, 3, and 4 dimensions are discussed. *bject Headings:* **1. Aerological diagrams 2. Thermodynamic diagrams.**—*M.R.*

7.7–83 551.501.7 551.510.5

Ghosh, S. N. (*Harvard Univ.*), **Methods for the measurement of upper atmospheric aracteristics.** *Journal of Scientific and Industrial Research*, Sec. A, New Delhi, 14(6):277–84, June **1955.** 6 figs., 12 refs., 2 eqs. **DWB**—A review of technical methods, both direct nd indirect, for sounding the upper atmosphere. Indirect methods include radio echoes for obing ionosphere, acoustical sounding, searchlight methods for determining density, meteor nd auroral observations and spectroscopic studies of dissociation and recombination. Direct ethods include airglow, rocket and balloon measurements and direct determination of tem- rature, winds and ionization in the ionosphere. Laboratory and theoretical studies of icrowave propagation and photochemistry are also outlined and illustrated. *Subject Head- gs:* **1. Upper atmosphere sounding methods 2. Upper atmosphere physics 3. Ionospheric search.**—*M.R.*

OBSERVATIONAL DATA

See also: **Meteorological observations** (Gt. Brit. Met. Off.), 7.7–2; **Met. data** (Koził), 7.7–18; **Marine climatology** (Hamburg. Deutsches Hydrogr. Inst.), 7.7–53; **Clear air turbulence** (Chambers), 7.7–61.

7.7–84 551.506:551.586:63

Wannop, A. R., **Weather of 1954 and the Scottish farmer.** *Scottish Geographical Journal*, dinburgh, 71(1):22–26, April **1955. DWB**—The summer and autumn of 1954 were the orst in a score of years for hay and grain crop maturing and harvest. Almost all phases of is type of farming suffered from cool, rainy and sunless weeks and wind or heavy rain storms, gh humidities and wet soil that made harvesting and drying operations difficult. Prices of ttle food were therefore high but only in a few localities were results favorable. *Subject eadings:* **1. Abnormal weather conditions 2. Agricultural meteorology 3. Agronomy Scotland.**—*M.R.*

7.7–85 551.506.1(866)

*Ecuador. Armada. Sección Meteorológico Marítima, **Boletín Meteorológico de la rmada.** [Meteorological Bulletin of the Navy], No. 3, [1955]. unpaged. entirely tables.

DWB—Data for 9 stations with 2 to 6 years of record, including "normals" for entire p and data for 1953 and 1954 in separate columns. Data include monthly and annual tem ture, rainfall, cloudiness, humidity, vapor pressure, dew point, wind and hydrome Stations include San Cristobal (Galapagos), San Lorenzo, Esmeraldas, Bahra, Manta, Sa Guayaquil, Puna Is. and Puerto Bolivar. Two new stations were started in Dec. 195 Jan. 1955, respectively. (For Nos. 1 and 2, *see* 5.7–36, July 1954, *MAB.*) *Subject Hea* **1. Annual meteorological reports 2. Ecuador 3. Galapagos Islands.**—*M.R.*

7.7–86 551.506.1 :551.577.2

*Indonesia. Djawatan Meteorologi dan Geofisik, Djakarta, **Pemeriksaan hudjan** observations) **di Djawa dan Madura Indonesia.** [Rainfall observations in Java and Ma Indonesia.] v. 66, 1947, 1948, 1949, 1950. pub. Djakarta, **1953.** 1 piece, 147 p. a entirely tables. t-p. In Indonesian and English. Continuation of the title previ issued as *Indonesia. Magnetisch en Meteorologisch Observatorium te Djakarta, Regen nemingen in Nederlandsch-Indië.* **DWB**—Volume contains number and name of each st in Java and Madura, coordinates of each, rainfall in mm and number of days with rain for month and year, greatest in 24 hours in each year (1947–50), absolute maximum on rec 24 hours for over 600 stations in the postwar years (1947–48), and 1,000 stations in (For abstract of earlier title, *see* 5B–173, Feb. 1954, *MAB.*) *Subject Headings:* **1. Rainfall 2. Annual rainfall summaries 3. Indonesia.**—*M.R.*

7.7–87 551.506.1

*New Caledonia. Service Météorologique, **Résumé mensuel du temps en Nou Calédonie.** [Monthly weather review in New Caledonia.] First issue seen, Jan. 1 Latest issue seen, Sept. **1955.** Monthly. mostly tables. **DWB**—This monthly met logical summary contains daily temperature, precipitation and winds aloft data from Nou Tontouta, Konmac and Luganville, as well as ceiling, visibility and surface wind frequ data for those stations. Temperature and precipitation data from 13 and 30 station spectively on the West Coast, the East Coast and in the Loyalty Islands; miscellaneous c humidity, evaporation, insolation (hours), trade wind, west wind, and north wind frequ frequency of wind speeds; and a general summary of the weather of the month are also inclu *Subject Headings:* **1. Observational data 2. Monthly data bulletins 3. Airport climatic 4. New Caledonia.**—*M.R.*

7.7–88 551.506.1

*St. Helena. [Meteorological Service], **Meteorological observations at St. He 1912**(?)—Latest available, 1948, pub. **1954?** Compiled at the Meteorological Office, Lon Observations first published 1935. **DWB** has Dec. 1912–June 1913; 1935–1947–. for each month and the year for usual pressure, temperature, vapor pressure, relative humi cloud, rain, weather and wind frequencies at St. Helena (15°58′S, 5°42′W, 2063 ft el *Subject Headings:* **1. Annual meteorological reports 2. Climatic data 3. St. Helena.**—

7.7–89 551.506.1 :016

†*Switzerland. Meteorologische Zentralanstalt, **Annalen,** v. 90, 1953. [Yearbook, v 1953.] Zurich, **1954.** each section repaged. figs., tables, diagrs. refs. **Bibliograph Swiss meteorological and seismological literature in 1953,** p. iv–vi. **DWB, DLC**—Year contains complete meteorological data for 12 1st order stations, daily temperatures at J fraujoch, daily maximum, minimum temperatures and hourly means for Zurich and Sa temperature extremes for 7 normal stations, monthly and annual summaries of syn observations at 123 stations, summary of weather conditions for year 1953, hail stati and account thereof, precipitation and alpine totaliser records (300 stations), sunshine, ea quake, radiosonde and upper wind data for Payerne, evaporation and soil temperature, bibliography of >156 works (alphabetized by author) published on meteorology by Swis in Switzerland plus 5 articles abstracted separately. (For V. 86 (1949) and V. 87 (19 *see* 5.1–47, Jan. 1954, *MAB.*) *Subject Headings:* **1. Annual meteorological reports 2. liography of Swiss meteorological literature 3. Observational data 4. Switzerland.**—*M*

7.7–90 551.506.2(4,47) 551.589(4,47)

§Kuvshinova, K. V., **Osobennosti sinopticheskikh uslovii leta 1954 goda.** [Characteristics synoptic conditions during the summer of 1954.] *Priroda*, Moscow, 44(6):98–101, June 55. 3 figs., table. **DLC**—The summer of 1954 was characterized in Central Europe and in ropean Russia by unusually high rainfall amounts and air temperature. In Moscow for mple, the mean June, July and Aug. temperatures were 3.3°, 3.4° and 3.1°C, respectively, ve the normal. With the aid of synoptic charts, the author shows characteristics of the neral circulation and cyclonic activity over Central Europe and European Russia during 54 and compares them with the normals. *Subject Headings:* **1. Synoptic weather conditions General circulation 3. Cyclonic activity 4. Abnormal weather conditions 5. U.S.S.R. Central Europe.**—*I.L.D.*

7.7–91 551.506.2(426):551.577.37:551.311.2

Oakley, Kenneth P., **Some geological effects of a "cloudburst" in the Chilterns.** *Record Bucks*, 15(5):265–276, **1945.** 3 figs., 4 photos. Also Ovey, Cameron D., **Meteorological tes on the Chiltern "cloud-burst" of 17th May, 1936.** *Ibid.*:277–280. Abstracted from print. **GB-MO**—The storm occurred on a front between maritime polar air from NW and nstable warm air from ESE. Maximum recorded rainfall of 1.64″ was probably exceeded cally. Flooding occurred with formation of delta fans of sand and graval and erosion of nes. Earlier cloudbursts in the district are compared. *Subject Headings:* **1. Cloudbursts Chiltern Hills, England.**—*C.E.P.B.*

7.7–92 551.506.7(058, 43)

*Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer ienst, **Deutsches Meteorologisches Jahrbuch, 1948, Teil 5, Höhenwindmessungen in Linden-erg und Dresden. Radiosonden-Messungen in Lindenberg und Dresden.** [German leteorological Yearbook, 1948, Pt. 5, Upper wind measurements (and) Radiosonde measure-ients in Lindenberg and Dresden.] Berlin, Akademie-Verlag, **1954.** 118 p. almost ntirely tables. **DWB**—Extensive tables of data for daily observations at all levels, both for gnificant levels and dynamic heights as well as for constant pressure surfaces, height and ressure of freezing level and tropopause (s), relative heights of layers up to 50 mb and means or months. (For 1951 issue, *see* item 5E–235, April 1953, *MAB.*) *Subject Headings:* **1. Aero-ogical yearbooks 2. Upper air wind data 3. Dresden, Germany 4. Lindenberg, Germany.** —*M.R.*

INSTRUMENT CARRIERS

See also: **Rocket investigations** (Singer), 7.7–265.

7.7–93 551.507.3:612.275.1

Murray, William D. (*Res. Div., College of Engr., N. Y. Univ.*), **Gondola for physiological esearch in the atmosphere.** *Journal of Aviation Medicine*, St. Paul, Minn., 25(4):354–360, ug. **1954.** 4 figs. (incl. photos). **DLC**—A description of a container designed "to carry nimals weighing up to 20 pounds to altitudes between 80,000 and 100,000 ft and to maintain nterval conditions at a level to permit flight durations for thirty-six hours," developed at New ork Univ. in collaboration with the Aeromedical Laboratory, Wright Air Development Center. he requirements for an animal container are outlined and the New York Univ. container is escribed in detail with the aid of diagrams and photographs. A sketch of tests performed and lanned is given. *Subject Headings:* **1. High altitude research 2. Physiological meteorology . Air-borne animal container.**—*I.L.D.*

7.7–94 551.507.36

Klass, Philip J., **Solar energy could drive spaceship's electrostatic powerplant, IRE hears.** *viation Week*, N. Y., 62(17):76–82, April 25, **1955.** diagrs. **DWB**—Space ships would have s many as 40 huge reflectors to concentrate solar energy for power development. They would e supplied by commuter rockets. Electrical propulsion mechanism would allow great eduction in weight of ship, and higher exhaust velocities would be possible than with thermal ystems. Materials cannot stand high enough temperatures to give proper thrusts. The

limitations are emphasized, as well as design details. Finally, the MOUSE or earth sat for cosmic ray, auroral, electrical and other atmospheric studies is described by S. F. Sin Communication problems will arise from speed of satellite. It could be built in 3 to 5 with present facilities. Solar power plant for ship is illustrated and described. *Su Headings:* **1. Satellite observatories 2. "Mouse" observations 3. Interplanetary fli I. Singer, S. F.**—*M.R.*

7.7–95 551.507.362:551.

Prince, M. J. and Quirk, A. L., **Rocket instruments for the measurement of total radiation in the upper atmosphere.** Rhode Island. Univ. Upper Atmosphere Rese Lab., Contract AF 19(122)–249, Scientific Report, No. 1, **1955.** 54 p. 14 figs. (incl. phc 2 tables, 19 refs., eqs. **DWB**—This report summarizes the rocket phase of the prog directed toward the measurement of the intensity of solar radiation in the upper atmosp An instrument was designed, developed and constructed for use in the nose section of Aer rockets equipped with a Bi-axial Pointing Control (BPC) constructed by the Univ. of Colo Mechanical and electrical details varied from flight to flight to fit the instrumentation into available space of the BPC. A total of four such instruments was flown. In one of t flights the entire Aerobee nose-cone was mounted at the tip of a V-2 rocket. The other t were flown in standard Aerobee missiles. No data were obtained in these flights due e to a failure of the vehicle or of the pointing control. Flake semi-conductor bolometers used as radiation detectors with a chopped signal to permit the use of ac amplification. creased precision was achieved by telemetering only the part of the radiation signal abo fixed level. A description of the four instruments is given and the reasons for the cha during the development of the final instrument are discussed. Main emphasis is placed the last two instruments. *Subject Headings:* **1. Solar radiation measurement 2. Ro instrumentation 3. Bolometers.**—*Authors' abstract.*

7.7–96 551.507

Rosen, Milton W. and Snodgrass, Richard B. (*Naval Res. Lab., Wash.* 25, *D. C.*), **high altitude sounding rocket.** (In: Boud, R. L. F.; Seaton, M. J. and Massey, H. S. W. (*ed* **Rocket exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 46–52. ta 7 refs.) **DWB**—For many centuries man's conquest of vertical ascent proceeded slo limited by the heights of mountains and the altitudes attainable by air-supported vehic But in the last few years, sounding rockets have increased altitude records tenfold, and t bid fair to produce a similar increase within the next decade. The principal high-altit sounding rockets in use to-day are the Aerobee and Viking, since all the Wac Corporals and V-2's brought to the United States have been expended. Aerobees and Vikings have tra ported almost 9 tons of scientific instruments to altitudes between 30 and 136 mi. Twenty t of instruments were carried to similar heights by V-2's during the course of a six-year p gramme. New techniques for observing the flight performance of these rockets and for covering information from the instruments they carry are in common use. The sound rocket is the ancestor of future space vehicles—it is a significant step in extraterrestrial ploration. *Subject Headings:* **1. Rocket research 2. Rocket soundings 3. Rocket instrum tation.**—*Authors' abstract.*

7.7–97 551.507.362:523

Singer, S. Fred (*Physics Dept., Maryland Univ., College Park*), **Investigation of the so corona by means of rockets.** (In: Boyd, R. L. F.; Seaton, M. J. and Massey, H. S. W. (*ed* **Rocket exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 371–374. fi 6 refs.) **DWB**—It is suggested that rockets be used for the investigation of the outer so corona (predominantly the solar *F*- corona or dust corona). A rocket measurement has t principal advantages: (1) the background of scattered light from the atmosphere is substa tially reduced and (2) the region of wavelengths available for observations is vastly increas (from the infrared into the ultraviolet). These features, in particular, may make accessi for the first time the region at $5° - 30°$ elongation from the sun which is of great importa in linking the solar corona with the zodiacal light. *Subject Headings:* **1. Rocket Research Sun's corona.**—*Author's abstract.*

INSTRUMENTS

See also: **Barometer corrections** (Gödecke), 7.7–78.

7.7–98 551.508.21

Drummond, A. J., **Measurements of solar radiation in S. Rhodesia.** *South Africa. Weather Bureau, News Letter*, No. 63:2, June 30, **1954.** **DWB**—A brief description of the solar radiation measuring apparatus installed at the Goetz Observatory (Bulawayo) in Southern Rhodesia and the kind of data that will be collected after June 1954. *Subject Headings:* **1. Solar radiation measuring equipment 2. Southern Rhodesia.**—*I.L.D.*

7.7–99 551.508.21

Fleischer, R. (*Hamburg*), **Ein Universal-Strahlungssummenzähler.** [Universal radiation integrator.] *Berlin. Freie Universität. Institut für Meteorologie und Geophysik, Meteorologische Abhandlungen*, 2(4):152–162, **1955.** 3 figs., 3 refs. **DWB**—The completely electrical radiation integrator described and illustrated in this article is made up of a number of relatively inexpensive parts. (Overall cost if constructed by institution itself, would be 550 to 900 DM depending on type of galvanometer used.) Coaxial rotating mirrors provide calibration or base-line values for comparison with integrated results. Photocells, beams, mirror-galvanometers, relays, etc. are all illustrated with price of each according to manufacturer quoted. *Subject Heading:* **1. Radiation integrators.**—*M.R.*

7.7–100 551.508.21

Foster, Norman B. and MacDonald, T. H., **Silver disk pyrheliometry simplified.** *Monthly Weather Review*, Wash., D. C., 83(2):33–37, Feb. **1955.** 3 figs., 5 refs. **DWB**—The Abbot silver disk pyrheliometer, invented in 1908 by C. G. Abbot, is still used throughout the world to observe the flux density of the direct solar beam in a plane normal to the sun's direction—over 90 instruments being thus employed at present. It is also used to standardize solar radiation measurements. The reading of the instrument is complicated and requires considerable training. The authors have introduced some modifications to simplify procedures: 1) an automatic shutter driven by a solenoid connected to a clock, 2) eliminating 20 sec readings (alternating with 100 sec readings), since shutter speed is .01 sec and thus does not require the 20 sec interval to allow for irregular manual control, 3) buzzer warning 10 sec before 120th sec and a crank to move reading glass along thermometer scale and 4) automatic recorders and thermocouple junctions (not recommended). *Subject Headings:* **1. Pyrheliometer reading 2. Abbot silver disk pyrheliometer.**—*M.R.*

7.7–101 551.508.21

Georgi, J., **Kleine Hilfsmittel für Strahlungs- und andere physikalische Messungen.** [Minor aids to the measurement of radiation and other physical phenomena.] *Germany. Deutscher Wetterdienst. Instrumentenamt Nord, Hamburg, Technische Mitteilungen, New Ser.*, No. 1:19–21, **1955.** fig., 2 refs. **DWB**—Describes two small auxiliary devices for the measurement of radiative flux and other physical phenomena: 1) Chronograph. Measurements with aid of small pyrheliometers require for every individual measurement a precise marking of 10 or more periods at which the galvanometer's indicator passes through the individual scale lines in order to determine with greatest possible accuracy by graphical adjustment of the casual errors—the heating velocity of the "measuring body." From here one obtains, together with the fixed evaluation of the instrument, the caloric intensity of the measured radiative flux. Determinations of these evaluations are made easier by a special chronograph, constructed by the Firma W. Eigenbrodt, Hamburg, with electrical drive described in detail and illustrated. 2) Contact clock giving special signals at determined intervals during observation of the corresponding scale disc. The alarm clock is provided with a 5 sec contact by changing the contact wheel; other time-intervals can be selected. By interchanging the connection of a flashlight battery, either a lamp installed on the alarm clock flashes, or a tone signal resounds, every 5 sec. The precision of these signals is astonishing. *Subject Headings:* **1. Radiation instruments 2. Radiative flux.**—*A.M.P.*

7.7–102 551.50

Georgi, J., **Unsymmetrische Erwärmung und Abkühlung bei Strahlungsschreiben,** [[Asymmetrical warming and cooling in radiation recorders, Pt. 2.] *Germany. Deuts Wetterdienst des Instrumentenamt Nord, Hamburg, Technische Mitteilungen des Instrumen wesens, New Ser.*, No. 1:22–28, **1955.** 4 figs., 3 tables. **DWB**—For Pt. 1 with abstract, 7.1–144, Jan. 1956, *MAB*. *Subject Heading:* **1. Pyrheliometer errors.**

7.7–103 551.508

Matzke, Horst and Geselle, Paul, **Über ein Gerät zur Registrierung der nächtlic "effektiven Ausstrahlung."** [An apparatus for recording nocturnal "effective radiation *Annalen der Meteorologie*, 7(1/2):73–78, **1955/56.** 4 figs., 52 refs. **DWB**—A record Ångstrom pyrgeometer built at the Greifswald Observatory is described, with diagra photo and specimen record. It incorporates a rain shield. *Subject Heading:* **1. Noctur radiation measurement.**—*C.E.P.B.*

7.7–104 551.508

Radiation balance. *U. S. National Bureau of Standards, Technical News Bulletin*, 39(6–7, June **1955.** photo. **DWB**—The instrument described and illustrated was devised W. B. Mann of the U. S. Bureau of Standards for measuring low-activity (radioactive) emiss rates. Can be used for obtaining absolute values of a single source or for comparing t sources of nearly the same energy emission. It is rapid and accurate for calibration or certifi tion work on standards or testing equipment. The calorimeter principle used by Callend of N.B.S. in 1910 to measure solar radiation intensity and radon energy, is modified to provi a zero-needle deflection instrument which has no temperature difference or inequality on t two sides of the balance. *Subject Heading:* **1. Radiation instruments.**—*M.R.*

7.7–105 551.508.

Robinson N. (*Israel Inst. of Techn., Haifa*), **An occulting device for shading the py heliometer from the direct radiation of the sun.** *American Meteorological Society, Bulleti* 36(1):32–34, Jan. **1955.** 2 figs., table, 3 refs., 5 eqs. **DWB**—This occulting device has t advantage of being maintained at a constant distance from the detecting element for azimuths and altitudes of the sun and the effective occulting distance remains constant at times. The construction of the device and its design are described in detail with the aid photographs and a diagram and a table giving the radii of curvature of strips to be used specified times is given. *Subject Heading:* **1. Pyrheliometer covers.**—*I.L.D.*

7.7–106 551.508.5:536.

Höhne, Werner, **Über die Weiterentwicklung des thermoelektrischen Feinwindmesser** [On further development of the thermoelectric wind measuring instrument]. *Zeitschrift fü Meteorologie*, 8(7/8):243–247, July/Aug. **1954.** 2 figs., 4 refs., numerous eqs. Germa summary p. 243. **DWB**—A description of the improved wiring of the thermoelectric an mometer is presented. It is heated by means of an alternating current which can be obtaine either from the grid (after transformation to a lower voltage) or from an accumulator. Als the heat current can be held constant to a fraction of one percent. *Subject Heading:* **1. Thermo electric anemometers.**—*I.L.D.*

7.7–107 551.508.72:551.508.7

†Bleasdale, A., **The assessment of rainfall and evaporation.** *Institution of Water Engineer London, Journal*, 9(6):494–510, Oct. **1955.** 24 refs. **DWB**—In measuring rain or drizz the most important factor is the correct exposure of the gage; recommendations are given Dew and hail, and snow surveys, are mentioned, including a radioactive snow gage. Assess ment of rainfall by radar is not more than a useful accessory. The assessment of evaporatio and percolation is more difficult owing to the uncertainty in interpreting readings of evaporatio pans. H. L. Penman's and other computational methods are considered as alternatives. I the discussion R. W. Thompson and F. Law mentioned the difficulties of upland gages an criticized Penman's method. Bleasdale replied at length. *Subject Headings:* **1. Rainfal computation 2. Evaporation calculations.**—*C.E.P.B.*

7.7–108 551.508.74:551.574.41

Gelbke, Wolfgang, **Ergebnisse dreijähriger Taumessungen.** [Results of 3 years of dew surement.] *Annalen der Meteorologie*, 7(1/2):79–86, **1955/56.** 7 figs., 6 refs. **DWB**—v plates of porous porcelain were exposed 3 cm above ground at Greifswald shortly before set and weighed at sunrise. Daily observations 1951–53 are plotted and discussed, and pared with Potsdam and Kloster/Hiddensee. Amounts ranged up to 2 mm. The monthly ns, number of dew nights and mean amounts are plotted by months and related to wind ed at 1 m and to cloud amount. G. HOFMANN discusses the thermodynamics of dew mation. *Subject Headings:* **1. Dew measurement 2. Drosometers 3. Greifswald, Germany.**—*C.E.P.B.*

7.7–109 551.508.761

Georgi, Johannes, **Der photographische Himmelsspiegel.** [The sky camera.] *Annalen Meteorologie*, 7(1/2):97, **1955/56. DWB**—A photo of clouds along with date and time be obtained by photographing a convex mirror with a small camera or film camera. It can enlarged by projection through the same camera. A full report will appear in the **Einzelöffentlichungen** of the Hamburg Seewetteramt. *Subject Heading:* **1. Cloud cameras.**—*C.E.P.B.*

7.7–110 551.508.765:551.574.1:551.578.11

Sartor, Doyne, **The coalescence of small water drops.** *Royal Meteorological Society, arterly Journal*, 82(351):100, Jan. **1956.** 2 refs. **DWB**—Coalescence efficiencies found TELFORD and others (*R.M.S., Q.J.*, 81:241–250, April 1955; *see* 6F–361, June 1955, *MAB*) considered too high because electrical field was not allowed for. *Subject Headings:* **1. Coalescence 2. Drop size meters.**—*C.E.P.B.*

7.7–111 551.508.822(09)

Khakhalin, V. S., **SSSR—rodina radiozondirovaniia.** [U.S.S.R.—the fatherland of diosounding.] *Meteorologiia i Gidrologiia*, No. 2:48–51, March/April **1955. DLC**—The story of atmospheric sounding in Russia since 1875, when MENDELEEV first proposed an tomatic device for recording atmospheric pressure and temperature, to the work of P. A. OLCHANOV on the aerology of the free atmosphere is reviewed. The author asserts that the st successful radiosonde flight in the free atmosphere was carried out in the Soviet Union on arch 30, 1950 at 1344 h. The development of radiosounding in the U.S.S.R. since then is viewed and brief mention is made of work outside the U.S.S.R. *Subject Headings:* **1. Upper mosphere research 2. Radiosondes 3. History of radiosondes 4. U.S.S.R.**—*I.L.D.*

7.7–112 551.508.91:628.53

Air pollution instrumentation. *Instrument Practice*, London, 9(9):871–885, Sept. **1955.** figs., 9 refs. **DLC**—The efficiency of coal furnaces can be measured by % of CO_2, (CO+H) oxygen in emitted gases. Types of instruments described include: Centrifugal, Thermal nductivity, Absorbent and Infrared. For measuring oxygen a magnetic and a photoelectric ethod are given, and for sulphur gases a photoelectric method. Installations for measuring oke content and dust content, and B.T.U. meters for district heating schemes are illustrated. *ubject Heading:* **1. Atmospheric pollution instruments.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Refractive index forecasting** (Cowan), 7.7–12; **Arctic ice stations,** 7.7–28; **Airlines met. services** (Hille), 7.7–64; **Barotropic tendency computation** (de Lisle), 7.7–77; **Tornado forecasting** (Kraft, Conner), 7.7–147; **Local wind forecasting** (Kobayashi), 7.7–180.

7.7–113 551.509.21

§Hungary. Országos Meteorológiai Intézet, **Időjárási napijelentés.** [Daily weather lletin.] Vol. 68, No. 1, Jan. 1, **1955.** Issued in Budapest. Daily. About 6 p. each. **WB**—Contains: 1) Brief report on weather situation on morning of issue. 2) 24-hour

forecast. 3) Daily mean pressure and temperature and their normals and extremes ... 1871. 4) Charts for Hungary for the previous day, showing a) precipitation distribu... b) maximum and minimum temperature, c) minimum radiation temperature and d) miscel... ous values (snow, sunshine, etc.). 5) Synoptic surface chart for Europe for the day i... 6) Aerological data (pressure, temperature, humidity) for two daily sounding balloon as... up to 15 km (Budapest) and brief description of upper air development over Europe. 7) ... face observations for 31 stations and precipitation amounts for 98 stations (Hungary). 8... per wind data for several stations. *Subject Headings:* **1. Daily weather bulletins 2. Syn... charts 3. Hungary.**—*G.T.*

7.7–114 551.509...

Hinkelmann, K., **Rationalisierung der Wettervorhersage.** [Rationalizing wea... forecasts.] *Meteorologische Rundschau*, 9(1/2):10–12, Jan./Feb. **1956. DWB**—Forecas... rests on a determination of the atmospheric field at a fixed time (*diagnosis*), and a *prog*... of its future development. The limitations of both these, and their improvement and spee... up by electronic machine methods, are discussed. *Subject Heading:* **1. Numerical forecas...** —*C.E.P.B.*

7.7–115 551.509.312:551.50...

Smagorinsky, J. and Collins, G. O., **On the numerical prediction of precipitation.** *Mon... Weather Review*, Wash., D. C., 83(3):53–68, March **1955.** 8 figs., 15 refs., 40 eqs. ... liminary version as American Meteorological Society. District of Columbia Branch, **Proce... ings of the Workshop on Numerical Weather Prediction,** Wash., D. C., June **1954.** p. 50... 8 figs., 15 refs., 40 eqs. **DWB**—With the three-dimensional field of velocity predicted ... numerical methods it is possible to predict the moisture distribution and hence the occurre... of large-scale saturation. A three-parameter model was used to predict the 12-hour ... cipitation for the early stages of the storms of Nov. 24, 1950 and Nov. 5, 1953, neglec... cloud storage, supersaturation, a possible lack of condensation nuclei, evaporation from fall... droplets, and moisture sources. Large-scale orographic influences were taken into acco... A quantitative comparison of the predicted rainfall with the correspondingly large-s... smoothed observed precipitation indicated a skill comparable to that of the predicted fi... An examination of the small-scale observed rainfall indicated that in these cases convec... instability resulted in large standard deviations from the large-scale average. Numer... prediction of regions of convective instability, which is also shown, could for the time being ... utilized for subjective interpretation. *Subject Headings:* **1. Numerical forecasting 2. F... cipitation forecasting.**—*From authors' abstract.*

7.7–116 551.509.314:519.24...

Diehl, Hermann, **Zur Beurteilung von Mehrfachkorrelationstabellen in der Meteorolog...** [Use of multiple correlation tables in meteorology.] *Annalen der Meteorologie*, 7(1/2):12... 125, **1955/56.** 4 refs. **DWB**—As a measure of the goodness of a multiple correlation ta... Pearson's correlation ratio η is generally used, but η generally decreases when more values ... used though the applicability of the table is greater. This disadvantage is avoided by calcul... ing the value which η would reach if the observations were infinite in number. This is d... by multiplying the variances by $N/(N-1)$. *Subject Heading:* **1. Multiple regression te... niques.**—*C.E.P.B.*

7.7–117 551.509.33(4...

§Aristov, N. A. (*Moscow*), **A középrávu időelőrejelzés alapelvei a Szovjetunioban.** [Ba... principles of extended forecasting in the U.S.S.R.] *Időjárás*, Budapest, 58(6):341–3... Nov./Dec. **1954.** 13 figs. Russian and French summaries p. 341. Transl. by Mrs. ... Faragó. **DWB**—Also: complete German version: **Die Grundsätze der mittelfristigen Wett... vorhersage in the Sovjetunion.** *Acta Agronomica*, Budapest, 5(1/2):99–122, **1955.** Russi... and English summaries p. 121–122. **DA**—Long-range forecasting has been in practice in t... U.S.S.R. since 1922. Extended forecasts are issued daily for 3 days ahead and 7–14-d... forecasts are issued periodically. The technique used is MULTANOVSKIĬ's method which

sed on an analysis of natural synoptic periods. Such periods last from 5 to 7 days and may identified in the first two days of their appearance. The author discusses theoretical and actical details involved in the application of MULTANOVSKII's method. *Subject Headings:* **Long range forecasting 2. Multanovskii's method 3. Translations. I. Faragó, Lászlóné** *ans.).—G.T.*

7.7–118 551.509.33

†Flohn, Hermann and Hofmann, Alfred, **Methoden und Entwicklungsaufgaben der Mittel- d Langfristvorhersage.** [Methods and results of the development of medium and long nge forecasting.] *Meteorologische Rundschau*, 9(1/2):5–10, Jan./Feb. **1956.** 49 refs. **WB**—Researches in different countries are surveyed. Travelling waves in a turbulent mosphere have been considered by ESSENWANGER, but the development of blocking anti- clones is not yet fully understood. Medium range forecasts have been tried by synoptic trapolation, multiple correlation (BAUR) and dynamical methods. Long range forecasts .ve been based on correlation, anomalies, periodicities and other statistical methods. umerical calculations suffer from limitations of boundary conditions. Statistical verification briefly discussed. Finally, the economic importance of such forecasts is stressed. *Subject eadings:* **1. Extended forecasting 2. Long range forecasting.**—*C.E.P.B.*

7.7–119 551.509.33:551.509.54

Frolow, V., **Sur un essai de prévision à très longue échéance des pluies à Tananarive.** Attempt at long range rainfall forecasting at Tananarive.] *La Météorologie*, 4th Ser., No. 5:287–288, July/Sept. **1954. DWB**—The author shows that an analysis of 56 years of infall records at Tananarive made in 1937 revealed 2, 3, 4, 7 and 11.3 year cycles which inforce each other (or not) in certain years. From this LABROUSTE (H and Y) analysis it as concluded that there would be deficient rain for a few years following 1940–41, followed y a return to normal about 1950. This prediction was published in *Annales de Physique du lobe de la France d'Outre-Mer*, No. 24:188–190. Data for 1936–37 to 1951–52 for Tananarive owed that from 1942–46 the deficiency was about 200 mm and 1947–52 about normal. *ubject Headings:* **1. Long range precipitation forecasts 2. Precipitation cycles 3. Forecast erification 4. Tananarive, Madagascar.**—*M.R.*

7.7–120 551.509.33:6

Reichelderfer, Francis Wilton, **What progress in weather forecasting.** Paper for pres- ntation to a Refining Session, 34th Annual meeting, American Petroleum Institute, Chicago, l., Nov. 8, **1954.** Preprint, subject to correction. 6 p. **DWB**—Possibility of long range orecasts and accuracy thereof depends partly on definition of terms. Distinction should be ade between climatological prospects, generalized long range forecasts and specific synoptic orecasts giving specific information on temperature extremes, storms, etc. Period of forecasts also pertinent—whether for 24 hours, 3–7 days, 30 days or longer. Private or consulting eteorologists can interpret data available on national telecommunications circuits for specific eeds of industry. Climatological prospects or almanac forecasts can be useful but may prove isastrous if taken as real forecasts. Synoptic forecasts are "tailored" to existing weather onditions. Much research is being conducted throughout world on long range forecasting ased on cycles, sea temperatures, solar phenomena, etc. as seen in **Meteorological Abstracts nd Bibliography.** *Subject Headings:* **1. Long range forecasting 2. Industrial forecasting.**— *I.R.*

7.7–121 551.509.34

Donn, William L., **Be your own weather forecaster.** N. Y., Mercer Pub. Co., **1955.** 5 p. figs. **DWB**—Signs for the layman to help him forecast weather from clouds, wind, arometer, etc. are described and illustrated in a popular pamphlet. *Subject Headings:* **Amateur forecasting 2. Meteorological symbols.**—*M.R.*

7.7–122 551.509.34

Sloane, Eric, **Clues to the weather.** *Outdoor Life*, p. 74–75, 163, April **1955.** figs. Ab- racted from separated sheets. **DWB**—Popular but scientific rules-of-thumb for forecasting

bad weather in the next few hours, are listed and illustrated by clever drawings. *Subject Headings:* **1. Weather lore 2. Amateur forecasting.**—*M.R.*

7.7–123 551.509.5:551.

Gräfe, K. (*Hamburg*), **Zur Prognose der Globalstrahlung.** [Forecasting global radiation] *Berlin. Freie Universität. Institut für Meteorologie und Geophysik, Meteorologische Abhandlungen*, 2(4):145–151, **1955.** fig., 3 tables, 4 refs. **DWB**—Work done in 1952 and 19 to evaluate the accuracy of forecasts of global radiation from synoptic charts is reviewed. table and scatter diagram show the accuracy of the forecasts, when compared with act data from a Moll-Gorczyński solarimeter, to be very good. Forecasts were made at Seewetteramt in Hamburg on the afternoon of one day for the next day (from June to Sep Values were expressed in percent of maximum value and in cal/cm²/day. Synoptic a weather situations for special cases were discussed. It is concluded that better results can obtained in the German Coastal area by making more accurate special cloud (type and amou forecasts. *Subject Headings:* **1. Global radiation forecasting 2. Forecast accuracy 3. Ha burg-Fühlsbuttel, Germany.**—*M.R.*

7.7–124 551.509

Small, Robert T. (*U.S.W.B. Airport Station, Boise, Idaho*), **Objective method for use forecasting the wind at Boise, Idaho and related forecasting notes.** U. S. Weather Bure Nov. **1954.** 11 p. 5 figs., 3 refs., tables. Mimeo. Appended: his **Test of an object method of forecasting winds at Boise.** U. S. Weather Bureau, Nov. **1954.** 6 p. 3 fig 2 refs. Typescript. **DWB**—An objective tool based on 1952 and 1953 (July–Sept.) da has been devised for forecasting duration of down-valley (SE) winds at Boise, Idaho, and w tested against independent (1951) data and during the 1954 fire season was tested in act forecasting. The southeast winds are warm and dry, whereas the temperature falls a humidity rises markedly when the wind shifts to west-northwest. The diurnal change wind direction occurred on nearly 90% of the days in the 4 seasons studied. Pressure differe between Pocatello, Idaho and Pendleton, Oregon, the direction and speed of the maximu wind up to 6000 ft, the 24-hr change in minimum temperature and pressure changes at S Lake City and Yakima, Wash. were used as variables. Objective charts are presente Skill score was 0.39, 0.47, and 0.41 for dependent, independent and practice periods, resp tively. *Subject Headings:* **1. Objective wind forecasting 2. Fire weather forecast accura 3. Boise, Idaho.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

7.7–125 551.510.41:546.2

*Fonselius, Stig; Koroleff, Folke and Buch, Kurt, **Microdetermination of CO_2 in the a with current data for Scandinavia.** *Tellus*, Stockholm, 7(2):258–265, May **1955.** 5 fi (incl. photo), 3 tables, 7 refs. **DLC**—Krogh and Brandt Rehberg's (1929) method f estimation of CO_2 in atmospheric air has been investigated and modified. The method used for continuous investigation of the CO_2 content of the air in Scandinavia. A permane net of sampling stations has been established, 6 in Sweden, 4 in Finland, 3 in Norway and 2 Denmark. The samples are taken three times each month. A simple method of taking a samples is described. Current data for Nov., Dec. 1954 and Jan. 1955 are published. *Subj Headings:* **1. Carbon dioxide in the atmosphere 2. Air sampling and analysis 3. Scandinav** —*Authors' abstract.*

ATMOSPHERIC POLLUTION

7.7–126 551.510.42:546.

Fluorschäden bei Rheinfelden und Mohlin. [Damage by fluorine in Rheinfeld a Möhlin.] *Leben und Umwelt*, Basel, 12(3):69–71, Dec. **1955.** fig. **DWB**—Death of be damage to plants and injury to animals, especially cows, due to fluorine emitted from aluminiu works, is mapped. It shows the influence of prevailing winds. *Subject Headings:* **1. A mospheric pollutants 2. Fluorine.**—*C.E.P.B.*

7.7–127 551.510.42:551.594.1

Kühn, Udo (*Met. Obs. Dresden-Wahnsdorf*), **Die Beeinflussung der luftelektrischen mente durch Luftverunreinigungen.** [The influence of atmospheric impurities on nospheric electricity conditions.] *Zeitschrift für Meteorologie*, 8(7/8):236–243, July/Aug. 54. 11 figs., 44 refs. German summary p. 236. **DWB**—The author shows the influences rted by atmospheric impurities upon atmospheric electricity in the vicinity of a large city d the relationship of potential gradient and conductivity to wind direction and air mass. e existence of relationships between potential gradient and conductivity on the one hand d air mass, turbidity, and visibility on the other is demonstrated. The origin of diurnal riations in atmospheric electricity is due primarily to the austausch phase. The increased d strength and diminished conductivity associated with particular wind directions are pical for the conditions in large cities and can be generalized. The analysis is based upon ta for Dresden. *Subject Headings:* **1. Atmospheric pollution effects 2. Atmospheric ctricity 3. Dresden, Germany.**—*Based on author's abstract.*

7.7–128 551.510.42:551.578.41:551.555.8

Prokopovich, N. (*Minnesota Geological Survey, Minneapolis*), **Dust-snow storm in the inneapolis-St. Paul area on March 12, 1954.** *Science*, 120(3110):230–231, Aug. 6, **1954.** fs. **DLC**—The dust accumulated on the surface of the snow and was too fine for ordinary icroscopic study. X-ray examination showed presence of quartz and feldspar. The wind locity during the storm reached 40–50 mi/hr and the water precipitated amounted to 0.66 .; 298 g of dust/l of water were evaporated. *Subject Headings:* **1. Dust content of snow Dust falls 3. Minneapolis-St. Paul, Minn.**—*I.L.D.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Meteors** (Kaiser), 7.7–1; **Refractive index profiles** (Cowan), 7.7–13; **Upper atmos. physics** (Ghosh), 7.7–83; **Atmos. anomalies** (Klein), 7.7–84; **Vertical structure of upper wind** (Otsuka, Shimada), 7.7–183; **Winds in outer atmos.,** 7.7–184; **Eclipse effects on ionosph. reflection** (Ghose et al.), 7.7–250; **Ionospheric conductivity** (Singer), 7.7–265.

7.7–129 551.510.5

*Mulligan, J. E., Jr., **Investigations concerning a new ballistic standard atmosphere.** . *S. Naval Proving Ground, Dahlgren, Va., NPG Report*, No. 1346, March 21, **1955.** 21 p. figs., 2 tables, 13 refs., eqs. **DWB**—Geopotential altitude, not pressure, has been accepted the independent variable for both ICAO standard atmosphere and Ballistic standard mosphere for universal use in aeronautics and ballistics. Temperature (vertical temperature) the most critical dependent variable. The Ballistic atmosphere, especially that recommended by the Tripartite Working Group on Exterior Ballistics (1951), is more analytical ut in the interests of uniformity the decision is to use the ICAO atmosphere. Differences in veral variables (with height) between the two systems are shown in respect to absolute alues and to effects on calculated bomb trajectories. *Subject Headings:* **1. ICAO standard mosphere 2. Ballistic standard atmosphere 3. Upper air data.**—*M.R.*

7.7–130 551.510.535:551.594.7

Morgan, M. G. (*Dartmouth College*), **A review of VHF ionospheric propagation.** *Institute Radio Engineers, N. Y., Proceedings*, 43(6):752, June **1955. DLC**—Note about reception Whyalla, S. Australia, of 39 Mc police transmissions from N. America in Oct.–Dec. 1947 nd 1948, between 0800 and 1200 local time, and for 2 or 3 days at 27-day intervals. The gnals were sometimes strong enough to drown out the FM radio telephone circuit from Crystal rook, 45 mi away. It was finally verified that the signals came from S. Dakota State Police from nearby states or provinces of Canada, and the police in S. Dakota reported hearing ustralian stations during the same period (reports not verified). Period came at sunspot axima and at 11:30 to 15:30 at mainpoint of S. Dakota-S. Australia path (Fanning Island). *ubject Headings:* **1. Ionospheric radio wave propagation 2. South Australia.**—*M.R.*

7.7–131 551.510.535:551

Ratcliffe, J. A., **Movements in the ionosphere.** *Nature*, London, 177(4503):307–9 Feb. 18, 1956. 3 refs. **DWB**—Account of Royal Astronomical Society discussion on I 25, 1955. Drifts of electron irregularities show that phase of 12-hr rotating componen E region advances by 5°/km from 85–130 km and changes with seasons. Speed incre with height. Fading movements agree with meteor trail movements which are due t motion. The cause of this is discussed. In F region large scale ripples and small scal regularities travel with the same speed. Elongated (3 or 4:1) irregularities at 400 km w produce scintillation are discussed; their true drift is towards SW. Some suggestions a cause were made. *Subject Headings:* **1. Ionospheric movements 2. Ionospheric wi** —*C.E.P.B.*

7.7–132 551.510.535:0

Rawer, Karl, **Sur l'interprétation des mesures de la couche ionosphérique F_1.** [I pretation of measurements of the ionospheric F_1 layer.] *Académie des Sciences, Paris, Com Rendus*, 240(3):331–333, Jan. 17, 1955. 2 eqs. **DWB**—"Critical frequency" foF_1 for a more accurate definition. The observed values cannot be directly attributed to radiation which produces the F_1 layer. A significant correction is necessary, its sign depen on the theory accepted for the origin of the F2 layer. *Subject Headings:* **1. F1 layer crit frequencies 2. Definitions.**—*Transl. of author's abstract.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Rotating spherical shells** (Fultz), 7.7–139; **Turbulence decay** (Krzywoblocki), 7.7–176.

7.7–133 551.511:551.557:551.5

Dahler, Hermann, **Über die Winddrehung mit der Höhe und ein neuer Nachweis Nullschichteffektes.** [On the wind veer with height and new evidence of the null la effect.] *Meteorologische Rundschau*, 8(11/12):180–181, Nov./Dec. **1955.** 2 tables, 9 re 3 eqs. **DLC**—Changes of wind direction with height are associated with ageostrophic f and/or advective temperature changes. Although these mostly overlap, the null layer eff can be shown even without eliminating the advective temperature changes if the wind chan in the upper troposphere (here [Leipzig] 300/500 mb) are compared with the advectiv caused wind changes in the so-called divergence-free level (here 500/700 mb). *Subject He ings:* **1. Ageostrophic winds 2. Wind profiles 3. Null layer.**—*Transl. of author's abstract.*

7.7–134 551.511:531

Höiland, Einar, **On the stability of couette-flow of a fluid with parabolic gravitatio stability.** *Norske Videnskaps-Akademi i Oslo. Institutt vor Vaer- og Klimaforskning, Repo* No. 1, **1954.** 7 p. 3 refs., 29 eqs. **DWB**—A theoretical treatment of the problem of gravi tional stability or instability in fluid flow, leading to conclusion that a series of instabil waves will be set-up when constant gravitational stability is added to the "parabolic" stabil with a vanishing value for $z=0$ when there are longer wave lengths, and that when consta gravitational instability is added, the instability waves will appear for shorter wave lengt A formula is finally derived which eliminates the factor of constant gravitational stability instability. *Subject Headings:* **1. Gravity waves 2. Couette flow.**—*M.R.*

7.7–135 551.511:551.5

Krastanov, L. (*Sofia*), **A légköri turbulencia-kritérium új értelmezése.** [A new int pretation of the criterion of atmospheric turbulence.] *Időjárás*, Budapest, 59(1):7–12, Ja Feb. **1955.** 5 refs., 22 eqs. Russian and English summaries p. 7. Transl. by László A jeszky. **DLC**—Also: complete German version: **Neue Deutung des Kriteriums der Turbule in der Atmosphäre.** *Acta Agronomica*, Budapest, 5(1/2):265–272, 1955. Russian and Engli summaries p. 272. **DA**—The author develops a new expression for Richardson's criteri of atmospheric turbulent motion, containing the local gradients of enthalpy and of an analogo quantity called potential enthalpy. It is shown that the criterion is fulfilled in the laye

nediately above the ground, even for very low values of the exchange coefficient. Con- uently the conditions for development of eddy motion are, near the ground, easily fulfilled. ject Headings: **1. Richardson criterion 2. Enthalpy 3. Atmospheric turbulence. I. Au- zky, László** (*trans.*).—*Author's abstract.*

7.7–136 551.511:551.515

Stümke, H., **Theorie der Gleichgewichtsänderungen durch Wärmezufuhr an eine an- glich ruhende, adiabatisch geschichtete Atmosphäre.** [Theory of equilibrium changes a result of heat advection in an initially still, adiabatically stratified atmosphere.] *Meteoro- ische Rundschau*, 8(11/12):187–191, Nov./Dec. **1955.** 4 figs., 12 refs., 30 eqs. **DLC**—For originally still atmosphere, adiabatically stratified or with a very warm stratosphere over an abatically stratified troposphere two cases of small symmetrically rotating disturbances considered, which are characteristic for steady or irregular heat influx with convection. e influence of the height of the heat source on surface pressure, the position of the boundary tween ascending and descending motion (zero layer in thermally caused pressure systems) d the reality of disturbances as a result of pure convection are discussed. *Subject Headings:* **Convective heat exchange 2. Barometric disturbances.**—*Transl. of author's abstract.*

GENERAL CIRCULATION

See also: **Cloud forms and jet stream** (Dwyer), 7.7–200.

7.7–137 551.513:629.13

Du Jonchay, I. and Mironovitch, V. (*Paris*), **Les courants aériens de l'hémisphère sud.** tmospheric currents in the Southern Hemisphere.] *I.U.G.G. Association of Meteorology, russels, 1951, Procès-Verbaux des Séances, Mémoires et Discussion*, p. 81–85. pub. Brussels **53.** fig., tables. **DWB**—Discusses differences between the general circulation in the orthern and the Southern Hemisphere. A large number of Antarctic stations give a more act basis for such an evaluation. The importance of the great regularity of westerly flow r aviation is stressed, and airfields on southern islands are recommended. *Subject Headings:* **General circulation 2. Aviation climatology 3. Southern Hemisphere.**—*A.A.*

7.7–138 551.513:551.515.1(4)

Kopcewicz, T. (*Warsaw*), **Cirkulációs indexek, ciklonkeletkezés és ciklonpályák Euró- ban.** [Indices of circulation, cyclogenesis and cyclone tracks in Europe.] *Időjárás*, udapest, 58(6):397–406, Nov./Dec. **1954.** 6 figs., 5 refs. Russian and French summaries 397. Transl. by L. Aujeszky. **DWB.** Also: complete German version: **Zirkulationsindexe, yklonenentstehung und Zyklonenbahnen in Europa.** *Acta Agronomica*, Budapest, 5(1/2): 37–200, **1955.** Russian and English summaries p. 199–200. **DA**—The importance of the onal circulation index for determining the extent of cyclogenesis and cyclone tracks in Europe explained. By combining the results of STUVE-MUGGE and of ROSSBY, cyclone tracks in urope may be classified according to six types of surface cyclone steering, as appearing on aps of mean pentade pressure at 3 km. *Subject Headings:* **1. Zonal index 2. Cyclogenesis Cyclone tracks 4. Europe. I. Aujeszky, László** (*trans.*).—*Trans. of author's abstract.*

7.7–139 551.513.1:551.511:532.5

Fultz, Dave (*Univ. of Chicago*), **Experiments combining convection and rotation and some their possible implications.** *Midwestern Conference on Fluid Mechanics, Univ. of Illinois, May 12–13, 1950, Proceedings*, pub. Ann Arbor, **1951.** p. 297–305. 6 figs. (incl. photos), refs. **DWB**—Brief summary of "dishpan" or rotating sphere experiments at the Univ. of hicago; expressed in terms of eddy or turbulent flow set up by convection (generated by heating om below) or obstacles. Similarity to atmospheric motions is stressed. Classical ideas of AYLOR and VETTEN are questioned on the basis of experimental results. The trade wind rculation is demonstrated in one experiment. Equipment and resulting circulation in dishpan" are illustrated for several cases, and idealized diagrams presented to help interpret sults obtained in apparatus. *Subject Headings:* **1. Rotating spherical shells 2. Convective lls 3. Hydrodynamics.**—*M.R.*

7.7–140 551.513.1:55

Hesselberg, Th. (*Oslo*), **On the role of the water vapour in the general circula** *I.U.G.G. Association of Meteorology, Brussels, 1951, Procès-Verbaux des Séances, Mém et Discussion*, p. 35–36. pub. Brussels, **1953. DWB**—Summary of paper presented meeting. Transport by eddy movement of mass, heat energy, potential energy is s compared with the transport by the mean monthly wind, while the eddy transport of w vapor, specific momentum, kinetic energy, condensation and freezing energy has the s order of magnitude as the transport by the mean wind. The transport of energy by w vapor diminishes the temperature between polar and equatorial regions. *Subject Head* **1. General circulation 2. Water vapor transport.**—*A.A.*

7.7–141 551,513.2:551.557:62

Frost, Bernard C. (*British Overseas Airways Corp.*), **Novos fatos sôbre o jet stre** [New information on the jet stream.] *Aviação*, Rio de Janeiro, 17(205):288, 299, Feb. 1 **DWB**—General treatment of properties of the jet stream as affecting flight over the N Atlantic, based on experience of the author and others flying or investigating the jet stre Meandering, foliation, altitude, etc. are among the aspects considered. (The second pa the article did not appear in the next issue, but a brief note entitled **Correntes de ar aucil vôos sôbre o Atlântico** gives a few more facts.) *Subject Headings:* **1. Jet stream struc 2. Jet stream flying 3. North Atlantic.**—*M.R.*

7.7–142 551.5

Kamata, T. and Horiuchi, G., **Stratospheric easterlies over Tateno.** *Journal of Meto logical Research*, Tokyo, 7(1):34–39, March **1955.** 5 figs., 10 refs., eqs. In Japanese; Eng abstract p. 34. **DWB**—On the basis of aerological data of the CMO and Winds Aloft servation Data at Tateno, the author analyzed the behavior of stratospheric easterlies Tateno. Mean altitude of W-E transition layer over Tateno increases from May to with minimum in Aug. The monthly mean altitude seems to increase with latitude. whole, the upper easterlies in summer seem to agree in general tendency with meridi differences of the constant pressure heights and in winter are probably due to adiabatic hea in the lower stratosphere where descending flow is expected in the rear of tropospheric turbances. *Subject Headings:* **1. Stratospheric easterlies 2. Tateno, Japan.**—*Based authors' abstract.*

7.7–143 551.513.2:551.558.21:79

Kuettner, Joachim (*Air Force Cambridge Res. Center, Mass.*), **The exploration of the stream by sailplanes.** *Soaring*, Dallas, 19(3):11–13, 16–17, May/June **1955.** 4 figs. **DWB** Describes the structure of the jet stream and its usefulness in setting high altitude or l distance soaring records (with gliders) and the usefulness of gliders and B-29's studying t bulence and structure of the jet streams, and relates the experiences in jet stream flying the author and other members of the Mountain Wave Project or Project Jet Stream in Sierras and elsewhere. Records made by KUETTNER and WOODWARD in 1955 are mention and will appear in a subsequent article. *Subject Headings:* **1. Jet stream flying 2. Glid flights 3. Sierra Wave Project 4. Sierras, Calif.**—*M.R.*

7.7–144 551.513.7:551.54

Klein, William H. (*U.S.W.B., Wash., D. C.*), **The weather and circulation of Janu 1955: a month with a mean wave of record length.** *Monthly Weather Review*, 83(1):14– Jan. **1955.** 8 figs., 2 tables, 8 refs. **DWB**—Mean (Jan. 1–30, 1955) Northern Hemisph 700 mb chart shows a hemispheric wave number of only 3 at lat. 40°–45°N, with troughs Europe, Japan and the West Atlantic. A strong zonal current attending the extremely l wave length agrees with ROSSBY's wave formula (1939). Across U.S.A. wave was 81° of lo from trough to crest, longest ever observed. Heights at 700 mb over NW Atlantic w lowest ever observed (since Oct. 1932), with an anomaly of −540 ft ($>3\sigma$). Surface anom of pressure SE of Newfoundland was −23 mb—largest in 56 years. Effects on weather a daily or weekly components are discussed and illustrated. *Subject Headings:* **1. Atmosphe circulation anomalies 2. Long waves in monthly mean circulation 3. Pressure extrem** —*M.R.*

7.7–145 551.513.7:551.506

§Klein, William H., **Weather and circulation of February 1955: another February with contrasting regimes.** *Monthly Weather Review*, Wash., D. C., 83(2):38-44, Feb. **1955.** figs., 11 refs. **DWB**—The first half of Feb. 1955 was characterized by fast moving westerlies d a blocking high over Greenland accompanied by below normal temperatures over most the U. S., whereas in the second half of Feb. the zonal flow was weak and the maximum ed reduced from >12 to <8 m.p.s. and shorter wave lengths, greater amplitudes, tem-atures 15° to 18°F below normal over the Great Plains and +12° in New England. Details surface and upper air circulation are discussed and illustrated. *Subject Headings:* **1. Weather omalies 2. Atmospheric circulation anomalies 3. United States.**—*M.R.*

ATMOSPHERIC DISTURBANCES

See also: **Storm tide research** (Reid), 7.7–60; **Barometric disturbances** (Stümke), 7.7–136; **Circulation indices** (Kopcewicz), 7.7–138; **Pressure jump lines** (Holleyman, Hand), 7.7–171; **Upper air pressure** (Maede), 7.7–173; **Cyclone position and sky condition** (Hata), 7.7–198.

7.7–146 551.515.13:551.577.21

Sawyer, J. S., **Rainfall of depressions which pass eastward over or near the British Isles.** *eat Britain. Meteorological Office, Professional Notes*, No. 118, **1956.** 13 p. 7 figs. At ad of t.-p. MO524r. **DWB**—Rainfalls associated with depressions moving E. on 4 tracks tween Faroes and N. France in 1941–50 were charted, and charts of average rainfall drawn r each track. All suggest a maximum of about 15 mm near the mean track, falling off north id south. Tracks over Britain show a greater rainfall to S. of the track in the west, to the rth of the track in the east. Rainfall in individual depressions varied from <0.1 to >40 m. Statistical relations were calculated between rainfall and synoptic characteristics, oisture content and stability of warm air mass, and frontal structure, but were not close ough to give useful numerical predictions of rainfall. *Subject Headings:* **1. Rainfall in epressions 2. British Isles.**—*C.E.P.B.*

7.7–147 551.509.52:551.515.3(763)

Kraft, R. H. and Conner, W. C. (*U.S.W.B., New Orleans*), **Tornado forecasting criteria eveloped at New Orleans for the New Orleans Forecast District, Pt. 1, Major tornadoes. t. 2, Tornado forecasting.** U. S. Weather Bureau, March 24, **1955.** 14 p. 5 figs., table, f. Pt. 1 was received earlier, separately, in typescript, with 1954 imprint. **DWB**—Over 2% of all tornado deaths occurring in the U. S. in the past 37 years occurred in the New rleans Forecast District. The major belt spreads 500 mi N and S of a line from Big Springs, exas ENE through Little Rock, Ark. to N.E. Tennessee. The major tornadoes are respon-ble for the preponderance of deaths so should be segregated from small tornadoes when mpiling synoptic statistical aids for forecasting. A model of major tornadoes in the New rleans district shows pressure $\leq$1005 mb, 850 mb jet $\geq$30 kn, 500 mb jet $\geq$45 kn, pressure adient at surface of 11 mb or more, 700 mi to east, and low level shear of 20 k or more per 0 mi. When these conditions exist, tornadoes occur in 60% of cases, after establishing ove, types (westerly or easterly) are determined according to several objective criteria and en area to be warned determined (T zone) by procedure outlined (examples illustrated). *ubject Headings:* **1. Tornado forecasting 2. Objective tornado forecasting 3. Tornado eaths 4. New Orleans District.**—*M.R.*

7.7–148 551.515.71

Buschner, W., **Über die Dynamik stationärer Hochdruckgebiete.** [On the dynamics of ationary high pressure areas.] *Meteorologische Rundschau*, 8(11/12):182–186, Nov./Dec. 55. 6 figs., 8 refs. **DLC**—The origin and maintenance (against ground outflow) of both arm and cold anticyclones cannot be explained by advection of cold air. In a stationary mmetrical anticyclone the horizontal component of the gradient wind and horizontal tem-rature gradient are both small. The temperature conditions often change little, so that diation cooling and adiabatic warming by subsidence balance. The explanation is found in

the ageostrophic wind components resulting from outflow at the base and consequent inf at high levels. The process is similar in both warm and cold anticyclones. The only los energy is by surface friction. *Subject Heading:* **1. Anticyclone mechanics.**—*C.E.P.B.*

7.7–149 551.515.8:551.51

Beebe, Robert G. (*SELS Center, U.S.W.B., Kansas City, Mo.*), **Types of airmasses which tornadoes occur.** *American Meteorological Society, Bulletin*, 36(7):349–350, Se **1955.** 2 figs., 2 refs. **DWB, DLC**—The author points out the existence of the fourth t of precedent sounding (a sounding characteristic of the air mass associated with torn occurrence but taken before the actual occurrence of the tornado "and/or upstream from tornado location"). This type IV or "inverted V" sounding is illustrated and is descrit It is characterized by a complete absence of a lower moist layer and is associated with "ma of the long, narrow, rope-like tornadoes that occur . . . over the Western and Northern Pla States." *Subject Headings:* **1. Air masses 2. Tornado occurrence.**—*I.L.D.*

7.7–150 551.515.8(2

§Rodewald, M., **Rasche Wetterbesserung bei Durchgang einer Kaltfront.** [Ra improvement of weather during the passage of a cold front.] *Wetterlotse*, No. 96:7–9, J **1956.** fig. **DLC**—On Aug. 6, 1954, in 44°15′N, 8°38′W, a ship passed through a cold fr After a squall the rain ceased suddenly and visibility improved. Synoptic chart giv *Subject Headings:* **1. Cold fronts 2. Bay of Biscay.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Infrared transmission** (Howard et al.), 7.7–15; **Radiation effects on variations of oxygen content of surface water** (Sugiura), 7.7–58; **Solar radiation measurem.** (Prince, Quirk), 7.7–95; **Global radiation forecasting** (Gräfe), 7.7–123; special bibliography on **Snow micrometeorology**, p. 873.

7.7–151 551.521 523

Friedman, H. (*U. S. Naval Research Lab., Wash., D. C.*), **The solar spectrum below 2C angstroms.** *Annales de Géophysique*, Paris, 11(2):174–180, April/June **1955.** fig., 2 tabl 16 refs., eq. **DLC**—The extreme ultraviolet and X-ray spectrum of the sun has been explor with photon counters carried in several high altitude rockets flown since 1949. Although t spectrum down to 2000 Å had been photographed with comparatively high resolution us grating spectrographs, the rapid decline in solar emission at shorter wavelengths made desirable to develop sensitive detectors suitable for spectral studies without dispersive syste Several types of photon counter were built with comparatively high sensitivity and w their spectral responses confined to band widths of one or two hundred angstroms. Th have been successfully applied to the study of the ultraviolet in the neighborhood of 145 1500 Å, the maximum of the molecular oxygen absorption continuum, 1100–1300 Å whi includes L_α of hydrogen, and in the soft X-ray region from 10 to 100 Å. *Subject Headin* **1. Solar spectrum 2. Photon counters.**—*Author's abstract.*

7.7–152 551.521.

Chełchowski, Włodzimierz (*Inst. of Balneoclimatology, Poznań*), **Natężnie promieniowan słonecznego 6.–26. II. 1952 w 3 punktach rejonu Zakopanego.** [The intensity of sol radiation Dec. 6–26, 1952 at 3 places of area of Zakopane (Tatra, Poland).] *Przegląd M teorologiczny i Hydrologiczny*, Warsaw, 8(1):43–51, **1955.** fig., 3 tables, 3 refs. Engli summary p. 51. **DWB**—A comparison of results of actinometric measurements of sol radiation intensity made during Dec. 1952 with Moll-Gorczyński solarimeters at the reso of Zakopane (846.5 m), Gubalowka Hill (1135 m) and Kasprowy Wierch Mountain (1991 m Comparison shows that: 1) the radiation intensity at Gubalowka surpasses on clear wint days the corresponding solar intensity in the lowland by 15–40%; 2) there is a greater differen in radiation intensity between Zakopane (lower level) and Gubalowka (middle level) tha

tween Gubalowka and Kasprowy Wierch (higher level) because of Gubalowka's situation ove the winter fog and smoke-layers of the Zakopane valleys. *Subject Headings:* **1. Solar liation measurements 2. Solar radiation intensity 3. Tatra Mountains, Poland.**—*A.M.P.*

7.7–153 551.521.14:551.311.12

Hoinkes, H. (*Innsbruck*), **Über den Wärmehaushalt horizontaler Gletscherflächen in den pen.** [Heat balance of horizontal glacier surfaces in the Alps.] *Berlin. Freie Universität. stitut für Meteorologie und Geophysik, Meteorologische Abhandlungen*, 2(4):53–62, **1955.** ables, 7 refs. **DWB**—The complicated problem of measurement of the energy balance at a int over a glacier is treated in theory, and measurements made during daytime and at night, spectively, by the author and collaborators in the Hornkees (Zillertaler Alps, 2262 m) in pt. 1951, and on Vernagtferner (Ötztaler Alps, 2973 m) in Aug. 1950 and July 1952 are mmarized in tabular form and discussed. Energy from radiation balance, evaporation, ndensation, convection, rain and total absorption, amount of water from melting and aporation, and the ablation both calculated and observed are included. Good agreement is ted for both energy balance and water content by theory and measurement. It was found at on a fair day in summer, a glacier surface with an albedo of 0.37 absorbed 350 cal/cm² in hrs. Short wave radiation comprises 70–80% of the absorbed energy on a fine summer y. Energy from rain, evaporation and condensation are almost negligible on summer days to 8%) but can be appreciable at night and at other seasons. *Subject Headings:* **1. Albedo glaciers 2. Glacial ablation 3. Vernagtferner Glacier, Alps 4. Hornkees Glacier, Alps.** *M.R.*

7.7–154 551.501:551.521.14

Portman, Donald J., **The measurement of radiation.** *Johns Hopkins Univ. Laboratory Climatology, Publications in Climatology*, 7(2):289–292, **1954.** 2 figs., 3 tables, 2 refs. **MH-H**—Short description of radiation measurement, made in connection with micrometeorological observations. The net radiation was measured with a Gier and Dunkle instrument mbined with a recording system. A 10-junction Eppley pyrheliometer with a micromax corder was used for solar radiation. The albedo, measured with a pyrheliometer was from 055 for wet soil up to 0.162 for dry soil. Very wet soil (after thawing) had an albedo of 0.23 nd snow 0.69–0.74. *Subject Headings:* **1. Albedo measurement 2. Albedo of soil 3. Albedo snow.**—*A.A.*

7.7–155 551.521.14:551.501

Shackleton, H. R. and Quirk, A. L., **A contribution to the measurements of the arth's albedo.** Rhode Island. Univ. Upper Atmosphere Research Lab., Contract AF 9(122)-249, Scientific Report, No. 3, July 29, **1955.** 14 p. 5 figs. (incl. photos), ref., 2 eqs.— balloon-borne instrumentation for the measurement of insolation at high altitudes as described in Scientific Report, No. 2 was modified for the purpose of making high altitude measurements of the irradiancy of a pyrheliometer due to the radiation reflected from the earth's rface, atmosphere and clouds. From the irradiancy an estimate of the earth's albedo has een deduced. The irradiancy was measured by a 50-junction Eppley global pyrheliometer hich was mounted in an inverted position on the bottom of the instrumentation. A micro-mmeter which was connected to the pyrheliometer was photographed at half-minute intervals uring flight. Two additional cameras were employed to photograph the terrain and/or clouds. wo flights were attempted, only one of which was successful. The data were obtained ove a thinning overcast. This condition is probably reflected in the results obtained. An itial value of approximately 60% was obtained for the earth's albedo. This gradually ecreased during the succeeding two hours to 29%, presumably with diminishing cloud cover. his value of 29% apparently obtained throughout the remaining hour of flight, although cording during this period was intermittent. In view of both the incompleteness of data nd the assumptions made in arriving at the result, it is difficult to ascribe a degree of error. nly an order of magnitude of albedo was sought, however. Since temperature corrections ere not incorporated, the instrument error is of the order of 10% or less. *Subject Headings:* **Albedo of earth 2. Albedo measurement.**—*A.A.*

7.7–156 551.5

Chu, Chiao-Min (*Detroit Inst. of Technology*) and Churchill, Stuart W. (*Univ. of Michi Ann Arbor*), **Representation of the angular distribution of radiation scattered by a spher particle.** *Optical Society of America, N. Y., Journal,* 45(11):958–962, Nov. **1955.** 2 fi 11 refs., numerous eqs. **DWB, DLC**—Exact expressions have been derived from the equations for the angular distribution coefficients, a_n, in the equation,

$$f(\theta) = \frac{1}{4\pi} + \frac{1}{4\pi} \sum_{n=1}^{\infty} a_n P_n (\cos \theta),$$

proposed by HARTEL for the fraction of randomly polarized radiation scattered by a spher particle into a unit solid angle in the direction θ. The coefficients are functions of the wa length, particle diameter, and physical properties, and $P_n (\cos \theta)$ are the Legendre polynomi This equation is shown to be more convenient in form for tabulation of the scattering pr erties and for application than the intensity functions used by Mie and most subsequ investigators. Approximate methods for evaluating the coefficients were found to be accurate or inconvenient. The exact expressions, although detailed, are suitable for straig forward computation. *Subject Headings:* **1. Scattering of radiation 2. Radiation calculation** *Authors' abstract.*

7.7–157 551.521.3:546.246 551.521.3:551.

Feigel'son, E. M., **O pogloshchatel'nykh svoĭstvakh vodianogo para i uglekislogo gaz atmosfere.** [Absorptive property of water vapor and carbon dioxide in the atmosphere *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 1:69–79, Jan./Feb. **1955.** 5 figs., 11 tab 9 refs., 7 eqs. **DLC**—Experimental data on transmission functions of water vapor and carb dioxide to long wave from 5 to 17μ are calculated by the method of E. S. KUZNETSOV. T results are used to construct a rough model of the spectrum of extinction adapted to proble of the theory of illumination. *Subject Headings:* **1. Absorption by water vapor 2. Carb dioxide absorption 3. Extinction.**—*Trans. of author's abstract.*

7.7–158 551.521.31:551.521

Kawamura, Kiyoshi, **Spectral intensity of the direct ultraviolet solar radiation reachi the earth's surface.** *Journal of Meteorological Research,* Tokyo, 6(7):209–213, Sept. 195 5 figs., 5 refs. In Japanese; English summary p. 209. **DWB**—Spectral intensity of t direct ultra-violet solar radiation of wave lengths 300 to 400 mμ, reaching the earth's surfa through the atmosphere, was calculated on the assumption that the sky is free from clou in the direction of the sun. In this case, we have assumed that the attenuation of radiati is caused by selective absorption of atmospheric ozone and by scattering due to air molecu and dust. A probable range of variation in the ozone amount is introduced in the calculati because its amount at the relevant place varies considerably according to the latitudes a seasons. The results of this calculation are shown in two figures. Spectral intensity of ultr violet radiation at any zenith angle of the sun will be easily obtained from these figures interpolation. *Subject Headings:* **1. Solar radiation 2. Ultraviolet radiation 3. Ultravio spectral intensity.**—*Author's abstract.*

TEMPERATURE

See also: **Temp. and humidity effects** (Weir), 7.7–68; **Mean daily temps.** (Crabb), 7.7–76; **Micromet.** (Halstead), 7.7–239; **Atmos. refraction** (Harada), 7.7–253.

7.7–159 551.524(71

*Currie, B. W., **Temperature [of] Prairie Provinces and Northwest Territories.** *Sa katchewan. Univ. Physics Dept., Prairie Provinces and Northwest Territories [Clima Studies,* Pt. 2], Aug. **1953.** 47 p. 26 figs., 11 tables, foot-refs. **DWB**—A long textu description of various features of temperature conditions over Alberta, Saskatchewan, Man toba, Yukon, and N.W. territories from the 49th parallel to the Arctic Ocean. Accompani by the tabular data for a number of representative stations in Canada (and U.S.S.R. in san

itudes), and isopleths showing frequency of extreme temperatures of varying degrees (hot d cold) and dates of frost, etc., length of frost-free season, upper air soundings in different asons, place or air masses. *Subject Headings:* **1. Temperature of Prairie Provinces 2. Temrature of Northwest Territories 3. Prairie Provinces, Canada 4. Northwest Territories, nada.**—*M.R.*

7.7–160 551.524(712)

*Currie, B. W., **Vegetative and frost-free seasons.** *Saskatchewan. University. Physics ept. Prairie Provinces and Northwest Territories:* [*Climatic Studies*, Pt. 4], Jan. 15, **1954.** p. 3 figs., 3 tables, 3 refs. **DWB**—An excellent approach to the presentation of data on ost free season or "growing" degree days, using records for 21 stations in N.W. Canada or the airie Provinces. Extreme, median, and quartile dates for first and last killing frost in utumn and spring give a sound basis for determining hazard of frost to grain crops or vegebles. Discussion of climatic limitations, unusually early or late killing frosts (July 24–25, 918 temperature was 20° in Peace River and 30° in southern limits of Prairie Provinces, and om Aug. 16 to 24, 1950 several killing frosts occurred in Prairies). Microclimatic factors, ariability of frost free season, etc. are discussed. *Subject Headings:* **1. Frost free period Frost data 3. Arctic agriculture 4. Prairie Provinces, Canada 5. Northwest Territories, anada.**—*M.R.*

7.7–161 551.524:79.092.2

Hoxmark, Guillermo, **Influencia climática en los Juegos Olimpicos.** [Climatic influence the Olympic Games.] *Sociedad Científica Argentina, Buenos Aires, Anales*, 158(1/6):44–54, uly/Nov. **1954.** 3 figs., 13 tables. **DLC**—The author has analyzed the scores of the various ountries competing in Olympic Games since 1920 and presents a number of statistical tables nd graphs to show the relative competency of various "racial" groups (Nordic, Saxon, Soviet, eutonic, Latin, "Austral Saxon," Middle East, etc.) and the correlation between mean annual emperature of the 18 countries competing (in 1920, 1924, 1936, 1948 and 1952) and scores of ese countries. It indicates that contestants coming from countries with the lowest mean nnual temperatures (e.g. Norway) have the highest scores, and from warm countries have he lowest scores. *Subject Headings:* **1. Climatic influence on sports 2. Olympic Games.**—*M.R.*

7.7–162 551.524.2

Péczely, György, **Hosszabb sorozatok normál-eloszlásának vizsgálata.** [Analysis of the ormal distribution of long series.] *Időjárás*, Budapest, 58(5):278–282, Sept./Oct. **1954.** g., 2 tables, 7 eqs. Also: Berényi, Dénes, **Hozzászólás a hosszabb sorozatok normál eloszásámak vizsgálatához.** [Comment on "Analysis of the normal distribution of long series."] *Ibid.*, 59(2):101–106, March/April **1955.** 2 figs., 3 tables, 6 refs., 3 eqs. Also: Péczely, György, **Válasz.** [Reply.] *Ibid.*, 59(3):192, May/June **1955.** 5 eqs. **DWB**—Annual ean temperature values from 60-year records of 37 stations in the Northern Hemisphere are nalyzed as to their normal distribution. It is found that normal distribution is least liable o occur in the Arctic and Tropical belts. It is shown that normal distribution occurrence is a onvenient criterion for characterizing large-scale synoptic conditions of a place. Berényi aises several theoretical objections against the formulas used by Péczely in determining he curve of normal distribution and calculating deviations. He believes that present staistical methods do not warrant the type of hemispheric climatic analysis undertaken by Péczely. *Subject Headings:* **1. Temperature distribution 2. Temperature normals 3. Northrn Hemisphere. I. Berényi, Dénes.**—*G.T.*

7.7–163 551.524.3:551.588.2

Reynolds, G., **Local temperature variations in Wirral.** *Weather*, 11(1):15–16, Jan. **1956.** WB—Comparison of temperature extremes at Bidston (200 ft, ridge top) and Grange Hill 80 ft, half way up slope), both in Cheshire 1/2 mi from Irish Sea. *Subject Headings:* **1. Temerature variations 2. Topographic effects 3. Cheshire, England.**—*C.E.P.B.*

7.7–164 551.524.32(43):5

Troeger, Heinz, **Der zeitliche Einsatz der Sommerhitze in Mitteleuropa.** [Tim setting in of summer heat in Europe.] *Meteorologische Rundschau*, 8(11/12):204, Nov./ **1955.** fig., 3 refs. **DLC**—Singularities bringing hot weather are due to stable anticycl over North and Central Europe. Dates of the summer heat maximum are related to radius vector of the track of the pole. *Subject Headings:* **1. Summer heat 2. Polar 3. Germany.**—*C.E.P.B.*

7.7–165 551.524.36:551.5

Eickermann, Walter, **Über ungleichförmige Klasseneinteilung bei Häufigkeitsun suchungen der Temperatur.** [On unequal class divisions in frequency investigations of perature.] *Meteorologische Rundschau*, 8(11/12):192–195, Nov./Dec. **1955.** 3 figs., tal 6 refs., 2 eqs. **DLC**—The Celsius (C) linear scale of temperature, based on the argu that the same increase of length or volume of a substance corresponds to a uniform incr of temperature, is bounded at −273°C. Dalton's (D) scale, unbounded at both end logarithmic and more logical. A conversion table from C to D is given. It is shown examples that transformation of °C to a geometric scale converts an irregular distribu into a normal one. *Subject Headings:* **1. Temperature frequency distributions 2. Tempera scales.**—*C.E.P.B.*

7.7–166 551.52

Heyer, E., **Die wetterlagenmässige Betrachtung strenger Winter.** [A consideration severe winters from the point of view of weather situations.] *Zeitschrift für Meteorolo* Berlin, 9(3):85–88, March **1955.** 5 tables, 3 refs. **DWB, DLC**—Eleven severe winters f the period 1881–1950 were investigated. The large scale weather situations connected with occurrence of severe winters is discussed, the relative frequency of large scale weather ty characteristic of severe winters and the relative frequency of large scale weather types ch acteristic of all winters are compared and the mean daily temperatures of large scale weat types during severe winters are presented. Data on the temperature characteristics of severe winters, relative frequency of large scale weather situations in the eleven severe wint deviation of relative frequency of the large scale weather situations from the average numb etc. are given. *Subject Headings:* **1. Severe winters 2. Large scale weather proces 3. Weather types.**—*I.L.D.*

SOIL TEMPERATURE

See: **Soil temps.** (Gol'tsberg), 7.7–237; **Microclimatic observations** (Matsubara, Nakatao), 7.7–240.

WATER TEMPERATURE

See also: **Geomorphological and hydrographic maps** (Kołodziejczyk), 7.7–31.

7.7–167 551.526.6 551.4

*Granqvist, Gunnar, **Surface temperature and salinity records along the coast of Finlan July 1940–June 1952.** *Finland. Merentutkimuslaitos, Julkaisu*, No. 155, **1954.** 105 almost entirely tables. **DLC**—Daily surface temperature and salinities published *in exten* for 39 stations in most cases for 14h and monthly temperature means, where available, a for 7h and 21h. A table shows where similar data for each station and year have been pu lished since 1899. *Subject Headings:* **1. Sea surface temperatures 2. Salinity 3. Baltic S 4. Finland.**—*A.A.*

7.7–168 551.526.6:551.4

Nagai, M. (*Nagasaki Marine Obs.*), **Note on the water mass separation.** *Japan. Centr Meteorological Observatory, Tokyo, Oceanographical Report*, 3(3):80–86, July **1954.** 8 figs 3 tables, 2 refs. In Japanese; English summary, p. 80. **DWB**—The method of water ma identification by means of the T-S diagram is not adequate to bring out the differences due the mixed condition of water temperature and chlorinity. The author, therefore, conside

e deviations from the mean value of each depth individually with respect to water tem- rature and compares the change of the water masses in the East China Sea area in summer 51 and 1952 and notes the differences of the mixed condition between water temperature and lorinity. The author shows that the blocks of negative correlation generally exist in the ixed area. *Subject Headings:* **1. Sea water 2. Chlorinity 3. Sea temperatures 4. China a.**—*Author's abstract.*

7.7–169 551.526.8(521.16)

Sato, Yoshimasa; Yoshida, Hideo and Fujiwara, Hitoshi, **On the water temperature in e middle course of the River Abukuma.** *Sendai, Japan. Central Meteorological Observatory, ulletin of the Meteorological Society for Research of Tohoku District,* 8(2):502–508, Jan. **1955.** figs., 3 tables. Also in: *Journal of Meteorological Research,* Tokyo, 6(10/11):502–508, Dec. **954.** Both in Japanese; English summary p. 502. **DWB**—The results are summarized as llows: 1. The water temperature of the River Abukuma is effected by melting snow from larch to June. Above all, its effect is most distinct in March and April. 2. The daily mean ater temperature in the vicinity of Fukushima City is higher throughout the year than the aily mean air temperature, especially in summer. 3. The yearly mean water temperature ows periodic variations, and the predominant periods are 14 months, 4 years and 9 years. *ubject Headings:* **1. River temperature variations 2. Abukuma River, Japan.**—*Authors' bstract.*

PRESSURE AND WIND

PRESSURE

See also: **Barometer reduction** (Gödecke), 7.7–78; **Ageostrophic winds** (Dahler), 7.7–133; **Atmos. circulation anomalies** (Klein), 7.7–144.

7.7–170 551.54 551.5:531.51

Dessauer, F.; Mercier, A.; Schaffhauser, E. and Schaffhauser, J., **Der Einfluss schneller chwerkraftänderungen auf die Atmosphäre.** [Influence of rapid gravity changes on the tmosphere.] *Helvetica Physica Acta,* Basel, 25(5):476–477, Sept. 15, **1952.** fig., eqs. **DLC**—Continuous small vibrations similar to the ones occurring in the earth take place in the tmosphere, even in complete calm, with periods of 1–10 sec and amplitudes of about 10^{-3} Hg. hey were first observed in 1938 by BAIRD and BANWELL in New Zealand, in 1939 by GUTEN- ERG and LENIOFF in America, and in 1944 by SAXER in Fribourg. In order to find out whether fluctuations of gravitational acceleration could be one of the causes of the phenomenon, theoretical analysis (of a differential equation for pressure amplitude) of the influence created y assumed rapid changes of gravitational acceleration (g-changes) on the atmosphere was arried out. It showed that in the range above 300 sec, the pressure variations occur syn- hronously with excitation and the amplitude tends toward the static value as limiting value. A comparison of experimental results shows that the influence of g-changes could be sufficient nly for the T value (duration), but even then it probably does not exist. *Subject Headings:* **. Gravity disturbances 2. Gravity variations.**—*A.M.P.*

7.7–171 551.541:551.515.8

§Holleyman, J. B. and Hand, J. M., **The successive pressure jump lines of August 16, 1954.** *Monthly Weather Review,* 82(8):237–244, Aug. **1954.** 9 figs., 2 refs. **DWB**—The unusual win pressure jump lines which moved from Pennsylvania south-southeastward into southern Virginia and North Carolina, is described and the relationship of the series of severe storms o the lines is discussed. The pressure jump lines were separated by an interval of 30 min. Most of the strong winds were associated with the first pressure jump line and the rain with ne second. The two pressure jump lines are believed to have been propagated at a level etween 850 and 750 mb. Synoptic charts, isolines of the pressure jump lines, location of icro-network of accelerated microbarographs, precipitation distribution and results of upper ir soundings are presented. *Subject Headings:* **1. Pressure jump 2. Atmospheric disturbances . Pennsylvania 4. Virginia 5. North Carolina.**—*I.L.D.*

7.7–172 551.3

Graffunder, W. and Günther, W. (*Fribourg*), **Einige Ergebnisse über die Ausbreitu der quasiperiodischen Luftdruckschwankungen.** [Some notes on the propagation of qua periodic air pressure variations.] *Helvetica Physica Acta*, Basel, 25(5):485–487, Sept. 1952. 2 figs. **DLC**—In spite of some limitations regarding the accuracy of results, t method of determining the direction of approaching air pressure variations by soundings a points is useful. Results of observations of the direction and speed of an advancing wa front made with a recorder and 3 pressure indicators located at 320, 410, 445 m distance a shown in two figures. One shows the direction of origin of the approaching wave. Alm all results are to be found in the W. to N.W. sector. Due to the short distance between t observed points the accuracy of measurements is high. Fig. 2 shows the phase velocity of t approaching wave front. The mean value of measurement is of about 339.3 m/sec, a little o the speed of sound which, according to the prevailing temperature, was about 335 m/s This is caused by the curvature of the sound ray in the normal temperature drop over t earth's surface. The measurements, carried out in March, showed indications that t direction of origin of the pressure variations was displaced in a similar manner as the cente of low pressure areas which occurred at the time in the Atlantic. *Subject Heading:* **1. Qua periodic pressure variations.**—*A.M.P.*

7.7–173 551.547:551.515.127 (

Maede, Hans (*Weatherforecasting Inst., Potsdam*), **Die aerologische Verhältnisse üb Tiefkernen bei mitteleuropäischen Trog- und Zentraltieflagen.** [Aerological conditio above deep cores during Central European trough and depression situations.] *Zeitschr für Meteorologie*, Berlin, 9(2):33-46, Feb. 1955. fig., 10 tables, 14 refs. **DWB, DLC**—T heights of six principal isobaric surfaces (1000 to 90 mb) were determined for 534 deep cor appearing over a period of 4½ years during central European trough and depression situatio on the basis of surface weather charts, and the seasonal and annual means of these heigh and of the thicknesses were calculated and compared with the normal. Corresponding su groups for the deep cores over land and water, for both winter and summer, are determine The deep lows extend up into the stratosphere and during winter they lie mainly over the s so that the troposphere is substantially colder and the stratosphere is warmer than norma Corresponding mean values of interdiurnal pressure and temperature changes were calculate On the average the lows fill slightly during summer, but markedly during the colder season especially in the lower stratosphere whereby the filling rate is almost the same over land and se Also mean values of temperature and pressure changes were calculated for nine subgroup By means of these values and a daily analysis of the initial subgroups, the average cour during summer and winter of such a deep low situation lasting for 5–6 days is described. Th results are compared with the conclusions of other investigators (P. RAETHJEN, etc.). *Subje Headings:* **1. Upper air pressure 2. Cold lows.**—*Trans. of author's abstract.*

TURBULENCE AND GUSTINESS

See also: **Wind data** (Georgi), 7.7–81; **Clear air turbulence** (Chambers), 7.7–61; **Atmos. turbulence** (Krastanov), 7.7–135.

7.7–174 551.551:533.

Chamberlain, Joseph W. and Roberts, Paul H. (*both, Yerkes Obs., Williams Bay, Wis consin*), **Turbulence spectrum in Chrandrasekhar's theory.** *Physical Review*, N. Y., 99(6) 1674–1677, Sept. 15, 1955. 11 refs., numerous eqs. **DLC**—The results of CHANDRASEKHAR' recent theory of turbulence are transformed in this paper from ordinary space (used exclusivel in his paper) to wave-number space. Consideration is limited to the case of stationary homogeneous, and isotropic turbulence. A "time-dependent spectrum" is defined in term of the scalar product of eddy velocities at two different times; this spectrum is related t Chandrasekhar's time-dependent correlation function by a Fourier transform, as in the con ventional, time-independent case. For infinite Reynolds number the spectrum is obtaine directly by transforming the correlation function into wave-number space; the spectrum i given by a much simpler expression than is the corresponding correlation function. Con

uently, an approximate (linearized) form of the *differential* equation for the correlation s been transformed to wave-number space, and this equation is readily solvable, even for a ite Reynolds number. For $k>1/v$ the spectrum vanishes, and this cutoff at large wave-mbers is interpreted as the disintegration of turbulence into laminar flow at dimensions ficiently small for viscosity to dominate over the inertial transfer of energy. Finally the neral, nonlinear correlation equation has been transformed into an integral equation for e spectrum, but a general solution has not yet been obtained for either the spectrum or rrelation. *Subject Headings:* **1. Turbulence spectrum 2. Turbulence theory 3. Chandrasekhar's theory.**—*Authors' abstract.*

7.7–175 551.551:016

†Dryden, Hugh L. (*Dir., N.A.C.A.*), **Turbulence problem today.** *Midwestern Conference Fluid Mechanics, Univ. of Illinois, May 12–13, 1950, Proceedings*, pub. Ann Arbor, **1951.** 1–20. bibliog. p. 13–20. **DWB**—A general lecture on present state of turbulence knowledge: definition, origin, mechanics of turbulent flow, spectrum of turbulence, transition, otropic and homogeneous turbulence, diffusion, hot wire anemometry, turbulent wakes and ts, flow in pipes and channels, mixing length, etc. Extensive bibliography classified according above categories. *Subject Headings:* **1. Turbulence 2. Turbulence bibliographies.**—*M.R.*

7.7–176 551.551:533.16:551.511

Krzywoblocki, M. Z. v. (*Univ. of Ill.*), **On the decay of turbulence in compressible fluids terms of vorticity.** *Midwestern Conference on Fluid Mechanics, 3rd, Univ. of Minnesota, March 1953* [*Proceedings*], pub. June **1953.** p. 413–425. 3 refs., numerous eqs. **DWB**—sing the generalized equations for propagation of correlation of random functions in turbulence f compressible fluids, the laws of decay of turbulence are derived in terms of vorticity. The ıw for (1) decrease of mean kinetic energy, (2) of mean vorticity, (3) of mean enthalpy and 4) of characteristic dimensions of velocity, density, temperature, etc. are derived. *Subject Headings:* **1. Turbulence decay 2. Vorticity in turbulence.**—*M.R.* (*from Introduction*).

WIND AND WIND VARIATIONS

See also: **Wind effects on trees** (Weischet), 7.7–182; **Snow forecasting** (Yasui, Kato), 7.7–212; **Micromet.** (Halstead), 7.7–239.

7.7–177 551.553.12

Khrgian, A. Kh., **O gorno-dolinnoĭ tsikuliatsii.** [Mountain-valley circulation.] *Vsesoiuznyĭ Geograficheskiĭ S"ezd, 2nd, Leningrad, 1947, Trudy*, 2:211–212, **1948. DLC**—Detailed investigations of the phenomenon of mountain-valley winds in Tseïs Canyon (Northern Caucasus) by a special expedition of the Central Geophysical Observatory (summer 1946) during which observations near the ground air layer and pilot balloon and radiosonde observations were carried out to obtain some characteristics of these winds on the basis of distribution of speed at different heights and of their reversal at various points of the canyon during the day (24 hrs) and during changing weather. It was found that this kind of circulation is very steady and is distinguished by low speed (1–2 m/sec) and a peculiar thermal structure. The spatial distribution of valley winds depends on the influence of the slopes. The development of a theory involves great difficulties because mountain-and-valley winds are a "three-dimensional" phenomenon and are not simple "winds of slopes" (declines). *Subject Headings:* **1. Mountain and valley winds 2. Upper air wind observations 3. Circulation theory 4. Tseïs Canyon, Caucasus Mountains 5. U.S.S.R.**—*A.M.P.*

SPECIAL WINDS

7.7–178 551.555.8:551.593.54

§Condron, Thomas P., **A study of harmattan haze at Maiduguri, Nigeria.** *U. S. Air Weather Service, AWS Technical Report* 105-49, Dec. **1944.** 12 p. 5 tables. **DWB**—For two months (Jan.-Feb. 1944) the harmattan was at its peak at Maiduguri, Nigeria airport—the worst station in the region for this phenomenon. Detailed data presented in this report show

that instrument or closed conditions occurred on 35 mornings or >50% of the days, and on 20 days the field was closed all morning, and on 9 consecutive days at the end of Jan. it was closed every morning. Haze begins in Oct. and ends in April. The cause is attributed to cold N. flow around last periphery of Azores High or S.E. periphery of Russian High, and comes as a cold front behind an intense Mediterranean Low. Local heating over the Sahara picks up the dust (convective instability); heavy dust particles settle out, leaving fine dust as haze to drift south over Nigeria. Forecast rules are given and case histories cited and illustrated. *Subject Headings:* **1. Harmattan haze 2. Dust storms 3. Maiduguri, Nigeria.**—*M.R.*

7.7–179 551.555.8

Motorin, G. S., **Svoeobraznaia pyl'naia buria.** [Peculiar dust storm.] *Priroda*, Moscow, 43(11):118, Nov. **1954. DLC**—Dust storms occur frequently in the Caspian region and the hydrometeorological station "Bassoli" recorded a mean annual number of 71 days with dust storms during 1950–1952. The author describes the effect of a dust storm which lasted from April 1–5, 1950 with strong (up to 12–15 m/sec) SE winds which left a sulfate deposit (up to 1.5 mm thick) within a 50–60 km radius of the settlement Nizhnii Baskunchak. The deposit which appeared after the disappearance of the dew on April 5 contained 4.9% calcium sulfate, 65.6% sodium sulfate, 26.7% sand-dust particles and 1.7% sodium-and-magnesium chloride. The sulfate dust was obviously transported from numerous sulfate lakes located in the Caspian region. *Subject Headings:* **1. Dust storms 2. Dust fall data 3. Caspian Region.**—*A.M.P.*

7.7–180 551.555.9:551.509.52

Kobayashi, Seichi, **The mechanism and forecast of the occurrence of the local severe wind "Yamaji."** *Journal of Meteorological Research*, Tokyo, 6(8):381–387, Nov. **1954.** 5 figs., table, ref. In Japanese; English summary p. 381. **DWB**—This is a preliminary study on the mechanism and forecast of a local severe wind called "Yamaji." The principal results are as follows: 1) Synoptic situations which cause the occurrence of the local severe wind "Yamaji" generally may be classified into four types, each of which has a characteristic pressure distribution and a characteristic trajectory of the severe wind. 2) Some statistical features of the local severe wind "Yamaji" are shown. 3) The principal observational results are explained as a disturbance of an atmospheric current flowing over a mountain. *Subject Headings:* **1. Yamaji wind 2. Local winds 3. Wind forecasting 4. Japan.**—*Author's abstract.*

WIND EFFECTS

See also: **Wind power research** (Nat'l. Res. Council, Canada), 7.7–3; **Wind currents in sea** (Fedorov), 7.7–55; **Wind driven currents** (Cajiura), 7.7–56; **Wind waves** (Yoshida et al.), 7.7–59.

7.7–181 551.556:634.9

Runge, F., **Windgeformte Bäume und Sträucher und die von ihnen angezeigte Windrichtung auf Terschelling.** [Wind shaped trees and shrubs and the wind direction which they indicate on Terschelling.] *Meteorologische Rundschau*, 8(11/12):177–179, Nov./Dec. **1955.** 4 refs. **DLC**—Cases of deformation by the strong winds are described. The trees are low and the upper branches often leafless or dead. On the higher dunes the trees are not deformed. Over the central plains between northern and southern coastal dunes deformation is from NW; in the south from W-WSW, indicating convergence over the high dunes in the south, but winds are often deflected by high dunes or buildings. *Subject Headings:* **1. Deformation of trees 2. Wind effect on trees 3. Terschelling, Netherlands.**—*C.E.P.B.*

7.7–182 551.556:551.552

Weischet, Wolfgang, **Bestimmung subregionaler Ventilationsunterschiede mit Hilfe der Windwirkung auf Bäume (Zusammenfassung).** [Determination of sub-regional ventilation differences from wind effect on trees. (Summary).] *Annalen der Meteorologie*, 7(1/2):119, **1955/56.** table. **DWB**—The anemometer network can be filled in by observations of the deformation of tree trunks. A scheme using a number of species is set out. *Subject Headings:* **1. Wind effect on trees 2. Wind mapping 3. Deformation of trees.**—*C.E.P.B.*

UPPER AIR WINDS

See also: **Clear air turbulence** (Chambers), 7.7–61; **Jet stream** (Frost), 7.7–62; **Upper air wind data** (Germany. Deutsche Dem. Rep. Met. und Hydrolog. Dienst), 7.7–92; **Ionospheric movements** (Ratcliffe), 7.7–131; **Ageostrophic winds** (Dahler), 7.7–133; **Jet stream structure** (Frost), 7.7–141.

7.7–183 551.557:551.510.52/3

Otsuka, Ryuzo and Shimada, Kenji, **On the vertical structure of upper wind in low latitudes.** *Journal of Meteorological Research,* Tokyo, 6(12):581–583, Jan. **1955.** 3 figs., ref. In Japanese; English summary p. 581. **DWB**—In this paper the author investigated the vertical structure of upper wind in low latitudes of the northwestern Pacific Ocean by using the upper wind observations at Kusaie, Truk, Ponape, Kwajelein, Eniwetok, Guam, Wake, Marcus and Iwojima during the period from March to May 1954, when H-bomb was exploded at Bikini Atoll. The results obtained are as follows: 1. Height of the tropopause in low latitudes during this period is about 16–17 km, with the maximum at about 12–13°N. 2. Time-cross sections of upper winds for the above stations show that easterlies are prevailing in the lower layer below 3 km, westerlies are prevailing in the layer between 3 km and the vicinity of tropopause and easterlies are prevailing again in the higher level above 21 km. The maximum wind in the higher easterlies is 65 mph which is observed at the level of 25 km over Guam. The maximum in the westerlies is 115 mph which is observed at the level of 14 km over Wake Island. *Subject Headings:* **1. Vertical structure of upper air winds 2. Tropopause—wind maximum 3. Upper air wind observations 4. Northwestern Pacific Ocean.**—*Authors' abstract.*

7.7–184 551.557:551.510.53

Winds in the outer atmosphere. *Meteorological Magazine,* London, 85(1004):48–55, Feb. **1956.** 2 figs., 2 tables, 8 refs. **DWB**—The discussion on Nov. 21, 1955, opened by P. Graystone, dealt with various means of estimating winds from 30–40 km (radar observation of balloons) to 400 km (stellar scintillation). Above 60 km no definite flow pattern has emerged. Isopleths of westerly wind component in summer and winter, 30–60 km, 90° lat. to equator, show maxima at 50–60 km in 20° (summer) and 40–50° (winter). The discussion covered the relation of upper winds to small-scale magnetic fluctuations, heating rates and thermal winds in 30–100 km, research into ionospheric "motion" and other points. *Subject Headings:* **1. Ionospheric movements 2. Stratosphere winds. I. Graystone, P.**—*C.E.P.B.*

7.7–185 551.557.3(595)

*Clarkson, L. S., **Analysis of winds at 40,000 ft. and 50,000 ft. over Singapore.** *Meteorological Magazine,* London, 85(1003):1–9, Jan. **1956.** fig., 6 tables, 12 refs. **DWB**—Radar winds are analyzed monthly 1951–53, 1954, 1955. Tables show scalar means, meridional and zonal components, vector means and standard vector deviations, constancy, 5% upper limits of easterly winds, and frequencies of large departures from mean and of 24-hr changes. The distribution is not normal circular. The 5% maximum at 40,000 ft ranges from 38 kn in April and Nov. to 69 in Sept.; at 50,000 ft from 51 kn in April to 96 in Sept. Owing to persistence the latest actual wind is the best forecast. *Subject Headings:* **1. Upper air wind variations 2. Singapore.**—*C.E.P.B.*

VERTICAL MOTION

See also: **Vertical wind velocity calculation** (Orlova), 7.7–74; **Jet stream exploration** (Kuettner), 7.7–148.

7.7–186 551.558.2:551.576.1:629.135.2

Harper, W. G., **An unusually smooth wave pattern in a condensation trail.** *Meteorological Magazine,* London, 85(1004):38–43, Feb. **1956.** 5 figs., 3 refs. **DWB**—On March 10, 1955, near Dunstable, a trail at 37,000 ft showed a wave length of 1½ mi in a region of great wind shear above a NE jet at 32,000 ft (tropopause 35,700 ft). It is attributed to a standing wave of amplitude 350 ft and up- and down-velocity 1200 ft/min, which caused an aircraft heading

into the wind to follow a sinusoidal track. The combined result is worked out graphically. *Subject Headings:* **1. Condensation trails 2. Standing waves.**—*C.E.P.B.*

7.7–187 551.558.21:629.135.2

§Chambers, E., **Lee waves over Green I air route London to southeast Ireland.** *Meteorological Magazine*, London, 85(1004):43–48, Feb. **1956.** 3 figs., 2 tables, 4 refs. **DWB**—An aircraft flying at 10,500 ft on Dec. 23, 1954, showed a cyclic drop of air speed from 200–175 kn and back. Synoptic chart, vertical section and upper air data are given. Conditions were favorable for waves in lee of Wicklow Mtns and Cotswold Hills, and the loss of airspeed was due to flight at constant altitude in descending portions of waves. A similar case in Italy is mentioned. *Subject Headings:* **1. Lee waves 2. Airplane performance 3. London-Southeast Ireland air route.**—*C.E.P.B.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY AND EVAPORATION

See also: **Temp. and humidity effects** (Weir), 7.7–68; **Water vapor transport** (Hesselberg), 7.7–140; **Absorption by water vapor** (Fe'gel'son), 7.7–157; **Micromet.** (Halstead), 7.7–239; **Refractive index** (Overcash), 7.7–254; special bibliography on **Snow micrometeorology,** p. 873.

7.7–188 551.571.36(678.1)

McCallum, David, **Extremely low humidities in Tanganyika.** *Weather*, 11(2):55, Feb. **1956. DWB**—On Oct. 17, 1955, relative humidity of 8% was recorded at Tabora at 15 h G.m.t. *Subject Headings:* **1. Humidity extremes 2. Tanganyika.**—*C.E.P.B.*

7.7–189 551.501.4:551.573

Haude, Waldemar, **Zur Bestimmung der Verdunstung auf möglichst einfache Weise.** [On the estimation of evaporation in the simplest manner possible.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(11), **1955.** 24 p. 11 figs., 4 tables, 21 refs. **DWB**—This study is concerned primarily with the determination of the saturation deficit and the validity of the mean monthly value of this coefficient. Potential and actual evaporation from bare soil was determined in pentad-values by single daily measurements of saturation deficit at 1400 hours with proper consideration of wind velocity or its deviation from monthly mean value. These values were compared with values obtained by means of the Piché-evaporimeter which integrates potential evaporation over a period of time. The relationship between potential evaporation and actual evaporation or saturation deficit is considered. The potential evaporation of oats and potatoes and their relationship to potential evaporation from cultivated soil and to the saturation deficit is examined. *Subject Headings:* **1. Evaporation estimation 2. Saturation deficit 3. Potential evaporation.**—*I.L.D.*

7.7–190 551.573:551.578.46

Monteith, J. L., **The effect of grass-length on snow melting.** *Weather*, 11(1):8–9, Jan. **1956.** 2 photos, tables. **DWB**—On Jan. 7, 1955 snow on Harpenden Common melted earlier on rolled cricket pitch than on long grass, because of better thermal contact with warm soil. On Feb. 14 snow on long grass melted first, because the air was warmer than the soil. *Subject Heading:* **1. Evaporation of snow.**—*C.E.P.B.*

7.7–191 551.573(672)

*Rodier, J. (*Service des Études d'Outre-Mer d'E.D.F.*), and Touchebeuf de Lussigny, P., **Étude de l'évaporation sur les surfaces d'eau libres en Afrique Noire Française.** [Study of evaporation from free water surfaces in French Equatorial Africa.] *Annuaire Hydrologique de la France d'Outre-Mer*, Paris, 1952:11–28. pub. **1954.** figs., 3 tables. **DWB**—A substantial treatise on evaporation in tropical regions, based on data from Félou (Senegal), Kénie (on Niger in Sudan), Fomi and Kindia (Guinea) and occasional data from other places in

N. Cameroons, Tchad, etc. Hourly variations in temperature, humidity and evaporation are shown in graphs and tables. Stations are shown on chart of W. Central Africa (a number of other evaporation stations are located on map). Types of measuring equipment are described and monthly values of evaporation and of coefficients of evaporation K, K_I and Kp tabulated for above stations. Comparison is made between amounts calculated from Dalton's law and from Piché evaporimeter. *Subject Headings:* **1. Evaporation from water surfaces 2. Evaporation instruments 3. French Equatorial Africa.**—*M.R.*

7.7–192 551.573:551.577.3:551.579.5:631.6

Smith, L. P., **Calculating irrigation needs.** *Scientific Horticulture*, Wye, 11:11–17, **1952/54.** 4 figs. **DA**—The ideas of H. L. Penman on potential transpiration are summarized. Monthly values for British stations show a linear relation to duration of sunshine. From calculated potential transpiration and rainfall, maximum output of water from soil can be calculated and irrigation computed for a planned deficit (a small deficit is preferable to irrigating to capacity). *Subject Heading:* **1. Irrigation calculations.**—*C.E.P.B.*

CONDENSATION

See also: **Icing of aircraft,** 7.7–66; **Dew measurem.** (Gelbke), 7.7–108; **Coalescence of small water drops** (Sartor), 7.7–110.

7.7–193 551.574.1

Isono, K. (*Geophys. Inst., Tokyo Univ.*), **Identification of ice crystal nuclei and other substances found in snow crystals by means of microdiffraction.** *Meteorological Society of Japan, Journal*, 33(1):37–38, **1955.** 2 figs., 2 refs. **DWB.** Also issued as *Collected Meteorological Papers*, Tokyo, 5(2), Dec. **1954,** Reprint No. 76. **MH-BH**—Snow crystals obtained at Shinkazawa and Ueda near Mt. Asama in the winter of 1952 and 1953 were examined under an electron microscope. Solid particles smaller than 1 μ were identified (and are illustrated) by the microdiffraction method as being made of clay. Particles as small as 100 Å were found in great number and were identified as NaCl. It is concluded that the ice nuclei important for rain formation are mostly clay minerals, and that sea salt nuclei occur at 10^6 $\sim 10^2/m^3$. *Subject Headings:* **1. Ice nuclei 2. Clay nuclei 3. Sea salt nuclei 4. Mt. Asama, Japan.**—*M.R.*

7.7–194 551.574.1:536.241

Rein, František, **O teplotě přechlazených vodních kapek.** [Temperature of supercooled water drops.] *Meteorologické Zprávy*, Prague, 8(3):75–76, June **1955.** 2 figs., 4 refs. Russian and German summaries p. 75. **DWB**—In an article published in *Geofisica Pura e Applicata*, Vol. 28, **1954** (*see item* 6I–102, Sept. 1955, *MAB*), M. Bossolasco determined the "nevosity index" (N = s/m, where s = frequency of snowfall from supercooled clouds and m = frequency of supercooled clouds with or without snowfall) for several Alpine mountain peaks and analyzed that index as a function of temperature and altitude. The author reports results of an analysis of nevosity on Lomnic peak (Tatra Mountains) by means of Bossolasco's formula. These results are in marked disagreement with those obtained by Bossolasco in the Alps. The author therefore cannot concur with Bossolasco's claim that the snowfall-temperature-altitude relationships determined by him have universal validity. *Subject Headings:* **1. Supercooled water drops 2. Nuclei and temperature 3. Tatra Mountains, Czechoslovakia.**—*G.T.*

7.7–195 551.574.41

Dickson, M. R., **Nose running and dew.** *Weather*, 11(1):30, Jan. **1956. DWB**—Suggestions about investigation of "dew drops" at the end of the nose, probably not due to condensation but to mucous secretion. *Subject Heading:* **1. "Dewdrops" on nose.**—*C.E.P.B.*

7.7–196 551.574.7:629.13

Brun, Edmond A. (*French National Council of Sci. Res.*), **Problèmes posés par le givrage des avions.** [Problems presented by the icing of planes.] *Advisory Group for Aeronautical Research and Development, Paris (AGARD), 3rd Assembly, Sept. 3–11, 1953, London, Proceed-*

ings, pub. Nov. **1954.** p. 27–40. eqs. **DWB**—The physical theory of ice formation on airplanes in supercooled clouds is reviewed in detail starting with the mechanics of suspensions, the thermodynamics of ice formation, the structure of clouds and reviewing instruments for measuring drop size, liquid water content, etc. Then methods of counteracting ice, especially those developed in the U.S.A. and Canada (chemical and thermal), are discussed. Finally, methods of research on icing are treated (in flight but especially in wind tunnels). Problems of producing artificial supercooled fogs effecting turbulence and introduction of nuclei are mentioned. *Subject Headings:* **1. Icing of aircraft 2. Icing in clouds 3. Wind tunnels.**—*M.R.*

7.7–197 551.574.7:629.13

*Brun, Rinaldo J. and Dorsch, Robert G., **Variation of local liquid-water concentration about an ellipsoid of fineness ratio 10 moving in a droplet field.** *U. S. NACA, Technical Note*, 3410, April **1955.** 51 p. 11 figs., 6 refs., 7 eqs. **DLC**—Trajectories of water droplets about an ellipsoid of revolution with a fineness ratio of 10 (10% thick) in flight through a droplet field were computed with the aid of a differential analyzer. Analyses of these trajectories indicate that the local concentration of liquid water at various points about an ellipsoid varies considerably and under some conditions may be several times the free-stream concentration. Curves of the local concentration factor as a function of spatial position were obtained and are presented in terms of dimensionless parameters that describe flight and atmospheric conditions. *Subject Headings:* **1. Icing of aircraft 2. Water droplet trajectories.** —*NACA abstract.*

FOG

See: **Studies of light intensity** (Thuman et al.), **7.7–257.**

CLOUDS

See also: **Jet stream** (Frost), 7.7–62; **Cloud obs.** (Williams, Radley), 7.7–75; **Condensation trails** (Harper), 7.7–186.

7.7–198 551.576.1:551.515.13(521.41)

Hata, Shoji, **The position of cyclone and the sky condition at the City of Niigata.** *Journal of Meteorological Research*, Tokyo, 7(2):107–108, March **1955.** 3 diagrs. In Japanese. **DWB**—Cloud types shown on polar coordinate graphs for various positions of low centers with respect to Niigata, Japan. *Subject Headings:* **1. Cloud types 2. Cyclone tracks 3. Niigata, Japan.**

7.7–199 551.576.1:629.13

Ireson, W. H. and Cramp, R. D., **Distrail at Laarbruch, Germany.** *Meteorological Magazine*, London, 85(1003):24, Jan. **1956.** photo. **DWB**—Photo of distrail in altocumulus at 18,000 ft on Oct. 20, 1955. *Subject Headings:* **1. Negative condensation trails 2. Laarbruch, Germany.**—*C.E.P.B.*

7.7–200 551.576.12:551.513.2:551.557

Dwyer, W. N. (*Met. Off., Cambridge*), **Cloud forms associated with "jet stream."** *Australian Meteorological Magazine*, Melbourne, No. 8:55, March **1955.** Reply by A. K. Hannay, p. 56. **DWB**—Evidence obtained in Tasmania on middle and high cloud formation in connection with a suspected jet stream and with actual pressure of a jet stream indicates the existence of a characteristic high level cloud, the characteristics of which are described. In **Reply** it is stated that high latitude wind maxima in a "double jet" occur with a frequency of 1 to 5 days/mo. These maxima seem to accompany the passage of cyclones, across and south of Tasmania and are spasmodic phenomena in comparison to the lower latitude jets. *Subject Headings:* **1. Cloud** forms **2. Jet stream clouds 3. Tasmania. I. Hannay, A. K.**—*I.L.D.*

7.7–201 551.576.3:551.590.24

Roller, Maria (*Vienna*), **Über die Veränderung einer Wolkenschichte während der Sonnenfinsternis am 30. Juni 1954 in den Ostalpenländern.** [The change of a cloud layer

during the solar eclipse on June 30, 1954, in the eastern Alps.] *Wetter und Leben*, Vienna, 6(7/9):165–167, 1954. fig. **MH-BH**—Evidence is presented to show that atmospheric changes caused by the eclipse led to a transitory formation of an almost closed Sc-layer similar to the "vesperalis" formation. The change of the cloud layer during the eclipse in the eastern Alps is shown diagramatically. *Subject Headings:* **1. Eclipse effects 2. Solar eclipse, June 1954 3. Cloud layer changes 4. Eastern Alps.**—*I.L.D.*

PRECIPITATION

See also: **Floods of 1952** (U.S.W.B.), 7.7–14; **Rainfall data** (Indonesia. Dajwatan Met. dan Geofisik, Djakarta), 7.7–86; **Cloud bursts** (Oakley), 7.7–91; **Precip. forecasting** (Smagorinsky, Collins), 7.7–115; **Rainfall in depressions** (Sawyer), 7.7–145; **Irrigation calculations** (Smith), 7.7–192; **Meteoric dust and rainfall** (Bhalotra), 7.7–251.

7.7–202 551.577:551.501.9

*Ropes, Gilbert E., **Precipitation over Northeastern Lake Michigan, Nov. 1952–Oct. 1953.** Detroit, Michigan, U. S. Lake Survey, Corps of Engineers, Jan. 10, 1954. each section repaged. Typescript (some sections photostats). **DWB**—Data for Nov. 1952 to Oct. 1953 for 6 special precipitation stations on islands in northeast Lake Michigan, and rainfall data for the same period from U.S.W.B. hydrologic-rain gage stations, together with a comparison of precipitation on the lake surface estimated from island gages with that computed from shore stations, are presented in tables and on charts and maps and analyzed. Detailed reports on the 14 W.B. stations, with charts showing surroundings, are appended. *Subject Headings:* **1. Precipitation networks 2. Precipitation data 3. Lake Michigan.**—*M.R.*

7.7–203 551.577.2(423)

*Archer, C. H., **The wettest areas of south-western England.** *Weather*, 11(2):35–39, Feb. 1956. 3 tables. **DWB**—Tables give the heights and estimated averages (1881–1915) of 6 stations on Exmoor (66–76″) and 6 on Dartmoor (72–84″) and the distribution discussed. The 4 wettest years on Dartmoor are listed. Rainfall on Bodmin Moor is also discussed. *Subject Headings:* **1. Rainfall distribution 2. Southwest England.**—*C.E.P.B.*

7.7–204 551.577.32:551.579.1:519.2:628.1

*Law, Frank, **Estimation of the yield of reservoired catchments.** *Institution of Water Engineers, London, Journal*, 9(6):467–487, Oct. 1955. 8 figs., 3 tables. Discussion p. 487–493. **DWB**—The "yield" of a reservoired catchment is defined. Its estimation depends on rainfall and, if known accurately, runoff. Rules for calculating the minimum runoff are set out, from rainfall alone, assuming a dry period of up to 36 months, and from runoff. Lapworth's probability method, and a correlation method based on variability of rainfall, are described with examples. The definition of the severity of a dry period and the corresponding permissible depletion of a reservoir are examined. Auxiliary pumping schemes to reduce the risk of depletion are recommended. In the discussion A. Bleasdale suggested the introduction of a persistence term into the calculations, and considered the best criterion of the variation of rainfall. Other speakers questioned the value of statistical methods. *Subject Headings:* **1. Water supply 2. Runoff evaluation.**—*C.E.P.B.*

7.7–205 551.577.36

*Bacsó, Nándor, **Az egyórás csapadékok gyakorisága és hozama.** [Frequency and amount of precipitation of one hour's duration.] *Időjárás*, Budapest, 59(1):13–28, Jan./Feb. 1955. 3 figs., 15 tables, 16 refs. Russian and German summaries p. 13. **DLC**—Frequencies of precipitation hours and values of hourly precipitation amounts are analyzed in detail from ombrograph records for Budapest (32 yrs), Szombathely (10 yrs) and Niregyháza (10 yrs). Average frequencies of duration and amount are presented in tables and graphs in absolute and percentage values. Light precipitation (0.1–0.9 mm) is found to be most frequent, with a maximum in winter and minimum in summer; medium precipitation (1.0–4.9) is next, with uneven seasonal distribution; heavy precipitation (5 mm or more) is least frequent, its maximum occurring in summer and its minimum in winter. In amount of precipitation the con-

tribution of medium precipitation is largest; light and, finally, heavy precipitation follow, the difference between these latter being very slight. All this is a result of differences between the annual march of cold- and warm-front precipitation. Probabilities of maximum hourly precipitation amounts are worked out. The observational data presented are compared with results of theoretical calculations. Practical applications of the study are indicated. *Subject Headings:* **1. Hourly precipitation data 2. Precipitation frequencies 3. Rainfall duration frequencies 4. Precipitation amount 5. Hungary.**—*Trans. of author's abstract.*

7.7–206 551.577.36:519.24

*†Essenwanger, O., **Wahrscheinlichkeitsansteckung und Erhaltungsneigung beim Niederschlag.** [Probability continuance and persistence tendency in precipitation.] *Meteorologische Rundschau*, 9(1/2):13–25, Jan./Feb. **1956.** 2 figs., 13 tables, 35 refs., 9 eqs. **DWB**—Probability in elements exhibiting persistence is discussed using frequencies of daily rainfalls at 5 stations near Hamburg and also 5 scattered stations in Germany. The theory of persistence and its relation to frequency distribution is discussed theoretically, but is not of much practical use, a logarithmic scale of rainfall amount and duration being sufficient. For the stations near Hamburg the relative frequency of rain in the 4 days following dry and rainy days is tabulated. Lengths of runs of dry and rainy days at Karlsruhe, persistence tendencies for different amounts at Hamburg, frequencies of daily rainfalls at Cherrapunji and rainfall durations at Locarno-Monti and Basel are tabulated and compared with expectancy. *Subject Headings:* **1. Precipitation frequencies 2. Statistical studies 3. Germany.**—*C.E.P.B.*

7.7–207 551.577.36(495)

Karapiperis, Photios P., **An exceptionally rainy October in Athens, Greece.** *Weather*, 11(2):60, Feb. **1956. DWB**—Oct. 1955 with 250.9 mm was the rainiest Oct. and the second rainiest month in Athens in 1857–1955; 28.7 mm fell in 20 min. Much damage resulted. *Subject Headings:* **1. Excessive precipitation 2. Athens, Greece.**—*C.E.P.B.*

7.7–208 551.577.36

Lewis, R. P. Waldo, **Pattern of rainfall.** *Meteorological Magazine*, London, 85(1003):9-13, Jan. **1956.** fig., 2 tables, 2 refs., 5 eqs. **DWB**—Statistical distribution of tabular hours in which specified amounts of rain fell is tabulated for a number of stations. All are fitted by $R/N_r = C \times 10^{k/r}$. C and k vary from 0.175 and 1.34 at Orkneys to 3.0 and 0.36 at Batavia. In general $1/C = 3.30k^2 - 0.24$. Other calculations are given. *Subject Heading:* **1. Rainfall frequency distribution.**—*C.E.P.B.*

7.7–209 551.577.37(942)

Lindsay, H. A., **Adelaide's record rain.** *Weather*, 11(2):51–53, Feb. **1956.** fig. **DWB**—Adelaide (S. Australia) has an average annual rainfall of 20″. On Feb. 6, 1925, in a monsoonal depression 6″ fell in $2\frac{1}{4}$ hrs (0.66″ in 7 min.). The progress of the storm and its effects are graphically described. *Subject Headings:* **1. Rainstorms 2. Adelaide, S. Australia.**—*C.E.P.B.*

7.7–210 551.577.37:551.577.53(42)

§Parry, M., **An 'urban rainstorm' in the Reading area.** *Weather*, 11(2):41–48, Feb. **1956.** 4 figs., 5 refs. **DWB**—A heavy localized thundery fall (maximum 1.36″) causing floods fell over town center on June 22, 1951. Synoptic chart shows a low over N. France. Instability was triggered off by urban influence; the town center was at least 4°F warmer than outskirts. *Subject Headings:* **1. Excessive rainfall 2. Urban influences 3. Reading, England.**—*C.E.P.B.*

7.7–211 551.577.37:551.579(43)

Ponndorf, J. and Wilser, O., **Meteorologische und hydrologische Untersuchung des Wolkenbruches bei Apolda am 26/27.6.1953.** [Meteorological and hydrological investigation of the cloudburst at Apolda, June 26/27, 1953.] *Zeitschrift für Meteorologie*, 8(7/8):194–204, July/Aug. **1954.** 8 figs., 2 tables. German summary p. 194. **DWB**—A detailed analysis is presented of the surface runoff associated with the cloudburst at Apolda on June 26/27, 1953. Only in the central region of the cloudburst did the runoff attain a maximum high water. The runoff values correspond to those recorded during similar natural catastrophies in Thur-

ingia. Maps showing the precipitation boundaries of the Ilm, isohyets for June 26–27, 1953 and for the second and third June decades and statistical data on the precipitation and runoff for the cloudburst under discussion are presented. *Subject Headings:* **1. Cloudbursts 2. Runoff 3. Apolda, Germany.**—*I.L.D.*

SNOW AND HAIL

See also: **Mountain met.** (Rikhter), 7.7–33; **Snow and ice research,** 7.7–48; **Snow depth** (Ishiyama, Kadowaki), 7.7–72; **Coalescence of water drops** (Sartar), 7.7–110; **Dust content of snow** (Prokopovich), 7.7–128; **Snow evaporation** (Monteith), 7.7–190; **Studies of light intensity** (Thuman et al.), 7.7–257; special bibliography on **Snow micrometeorology,** p. 873.

7.7–212 551.578.42:551.553.21:551.509.54(521.6)

Yasui, H. and Kato, H., **On the mechanism and the forecasting of monsoon snowfall in Noobi Plain.** *Journal of Meteorological Research,* Tokyo, 5(5):379–392, June **1953.** 22 figs., table. In Japanese; English summary p. 379. **MH-BH**—In Japan snowfall on the side of Japan Sea generally occurs when northwest monsoon winds are prevailing and on the Pacific side when a strong cyclone passes near the coast. An exception to this rule exists; in the Noobi Plain, on the Pacific side as well as the Japan Sea side, much snow often falls during outbreaks of polar air from the continent. The authors investigated the mechanism of such snowfall and found a method of forecasting it by means of a close correlation between snowfall and pressure gradient; there is heavy snowfall whenever a pressure gradient whose 240° component is larger than 16 mb/1110 km persists. Light snowfall occurs when such pressure gradient prevails temporarily. The pressure gradient chart presented in this paper appears to be a useful tool for forecasting snowfall. *Subject Headings:* **1. Snow forecasting 2. Noobi Plain, Japan.**—*From authors' abstract.*

7.7–213 551.578.45(428)

Richardson, W. E., **Snowfalls at and about Alston, Cumberland.** *Weather,* 11(1):18–20, Jan. **1956. DWB**—Historical records of great snowstorms near Alston (1000 ft) in the northern Pennines from 1765 to 1943. *Subject Headings:* **1. Snowstorms 2. Alston, England.**—*C.E.P.B.*

7.7–214 551.578.45(73)

§*U. S. Weather Bureau, **Collection of reports on the storm of Nov. 6–7, 1953.** Wash., D. C., U. S. Weather Bureau, Nov. **1954.** 67 p. tables, charts. **DWB**—A number of "post mortems" on the famous East Coast snowstorm of Nov. 6–7, 1953, makes it evident that the storm could have been forecast more accurately by objective, numerical or even conventional methods if the forecasters had known what they know now. The main synoptic study of the storm was made by J. R. Fulks for the U.S.W.B., the numerical prediction analysis by J. Smagorinsky (U.S.W.B.), objective analysis and comments by AROWA Project and J. J. George, and further comments by B. Haurwitz and John E. Wallace. Discussion by Air Force Weather Control at Andrews Field is also included. Numerous surface, upper level and prognostic charts are included with each discussion. The cyclogenesis was so rapid and movement inland so sudden that only a 12-hour prediction would have been certain. *Subject Headings:* **1. Synoptic case histories 2. Cyclogenesis 3. Snowstorm, Eastern United States Coast (Nov. 6–7, 1953) 4. East Central United States. I. Fulks, J. R. II. George, J. J. III. Smagorinsky, J.**—*M.R.*

7.7–215 551.578.46:656

Carnes, W. E. (*New York Central Railroad*), **Keeping the New York Central running in New York's snow belt.** *Eastern Snow Conference, Proceedings,* v. 2, **1953–1954,** p. 26–28. **DWB**—Difficulties in snow removal and ice conditions for railroad operation eastwards from Lake Ontario are described on the basis of practical experience. The snow accumulation is 150 inches, the highest east of the Rocky Mountains. *Subject Headings:* **1. Snow removal 2. Snow on railroad beds 3. Richland, N. Y.**—*A.A.*

7.7–216 551.578.46(410)

Snow survey of Great Britain, season 1954–55. *Meteorological Magazine*, London, 84(1002):361–366, Dec. 1955. 2 figs., 2 refs. **DWB**—Mean duration of snow lying 51 days (93 above 2500 ft) compared with average of 36 (81). Sept. 1954 to May 1955 described month by month with height distribution on 11 mountains. *Subject Headings:* **1. Snow surveys 2. Great Britain.**—*C.E.P.B.*

7.7–217 551.578.46(411)

Spink, P. C., **Summer snows on Ben Nevis and the Cairngorms.** *Weather*, 11(2):62, Feb. 1956. **DWB**—Account of surviving snow drifts in August 1955. They were smaller than in 1954 owing to smaller precipitation in 1954–5. *Subject Headings:* **1. Snow cover variations 2. Ben Nevis, Scotland 3. Cairngorms, Scotland.**—*C.E.P.B.*

7.7–218 551.578.7:63

Flora, Snowden Dwight (*U.S.W.B., Topeka, Kans.*), [**Hail losses. Series of articles from Rough Notes, Indianapolis.**] Contents: **Serious toll of hailstorms,** *Rough Notes*, 82(3):13–15, March **1939. Total hail damage defies computation,** *Ibid.*, 83(6):13–14, 55, May **1940. Hail damage of 1940 and other years,** *Ibid.*, 83(4):13–16, April **1941. 1941 hail losses severe and widespread,** *Ibid.*, 85(4):13–16, April **1942. Hail insurance on growing crops,** *Ibid.*, 17. **DWB**—This series of articles on hail losses in the United States contains a great deal of data on state-by-state losses to crops for the particular year that the article covers, and comparative data for previous years, especially for Iowa (detailed map of hail losses for 1923–38), where systematic reports have been made by townships since 1923. Pictures show hail 10 in. deep in streets of Trinidad, Colo. and damage to an auto by hailstones three in. in diameter (a frequent occurrence). Kansas, Iowa and Montana have greatest losses. *Subject Headings:* **1. Hail damage 2. Hail insurance 3. Crop hail damage 4. Iowa 5. United States.**—*M.R.*

HYDROMETEOROLOGY

See also: **Floods** (Hoyt, Langbein), 7.7–4; **Hydromet.** (Linsley, Franzini), 7.7–5; **Hydrolog. stations** (Germany. Deutsche Dem. Rep. Met. und Hydrol. Dienst), 7.7–10; **Floods, 1952** (U.S.W.B.), 7.7–14; **Flood protection** (Kulig), 7.7–71; **Snow depth** (Ishiyama, Kadowaki), 7.7–72; **Runoff evaluation** (Law), 7.7–204; **Met. and hydrol. investigation** (Ponndorf, Wilser), 7.7–211; **Soil moisture** (Rode), 7.7–238; **Soil moisture effects** (Schlüter), 7.7–241.

7.7–219 551.579:551.577.2(529)

*Formosa. Construction Department. Hydraulic Engineering Bureau, **Hydrological data of Formosa.** Taipeh, 1948. 160 p. numerous tables. numerous charts and diagrs. (many fold.) In Chinese. **DLC**—A fine hydrometeorological report, consisting of (1) history of flood damage prevention in Formosa and government agency responsible for such control; (2) characteristics of Formosan river basins; (3) list of precipitation stations; (4) list of water level stations, (5) list of runoff stations; (6) statistical data of rainfall, water level and runoff (monthly and seasonal) with isohyetal charts; (7) suspended silt or sediment in rivers; (8) and (9) temperature and evaporation data by month for many stations and (10) conclusions. *Subject Headings:* **1. Hydrologic data 2. Hydrologic stations 3. Formosa.**—*H. Arakawa, M.R.*

7.7–220 551.579.4:551.501.45

*Król, Henryk, **Analiza hydrologiczna powodzi na przymorzu zachodnim.** [Hydrologic analysis of floods on the western part of the Baltic Coast.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 6(3/4):115–126, 1953. fig., 7 tables. English summary p. 126. **DWB**—The coastal region of the Baltic Sea (Pomerania) is characterized by a transition from continental to oceanic climate due to the moderating influence of the Baltic Sea trough. After a description of the climatic peculiarities of the region during the various seasons, the author discusses (using hydrological data for 1888–1952) the highest water levels and runoffs for the 6 rivers of west Pomerania. In order to characterize the floods as to the probability of their occurrence he uses FORSTER's statistical method leading to the determination of a curve

of frequency of culminating runoffs during the period. Catastrophic discharges of the rivers vary between 292 m/sec on the Parsęta River at Bardy (when collapsed dams greatly increased the flood disaster) and 29.81 m/sec on the Laba River at Lebnk. Tables showing data of discharge runoff, frequency of floods and their probability, as well as the years of flood occurrences are included. 1888, 1922, 1935, 1940 and 1947 were the years of the greatest floods. *Subject Headings:* **1. Flood analysis 2. Flood forecasting 3. Pomerania, Poland.**—*A.M.P.*

7.7–221 551.579.5:625:631.4

Krimgold, D. B., **General approach to the problem [of Estimating soil tractionability].** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(3):376–378, **1954.** 3 refs., eqs. **DWB**—Basic factors affecting the moisture change in a given volume of soil are outlined. Since it is impossible to forecast these factors for a longer period and different localities, a climatological approach is suggested in order to give a general picture about soil trafficability for operational requirements. *Subject Headings:* **1. Soil moisture 2. Soil trafficability.**—*A.A.*

7.7–222 551.579.5

*†Krimgold, D. B. and Beenhouwer, O., **Estimating infiltration.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(3):421–432, **1954.** 3 tables, fig., 39 refs. **DWB.** Reprinted from *Agricultural Engineering*, 35(10):719–725, Oct. **1954. DA**—Data obtained by FREE et al. for the time (t) dependence of infiltration rates (F) on a large variety of soils are analyzed. The relation $F = ap^m t^n$ seems to hold for the majority of soils. The coefficient a varies between 1.9×10^{-6} and 3.1×10^{-6}, p is the noncapillary porosity; m is of the order 3–6 and n usually 3/4. Average infiltration rates are suggested for design purposes, distinguishing between five categories of soils, which are described in detail. *Subject Headings:* **1. Infiltration 2. Soil moisture. I. Free, G. R.**—*A.A.*

7.7–223 551.579.5

*Krimgold, D. B., **Hydropedological constants and mechanical properties of soils.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(3):441–447, **1954.** 2 tables. **DWB**—Total and capillary porosity, weight-volume ratio, water holding capacity, field capacity and available moisture content are given for 167 different soils. In addition, the "breaking moisture" (believed to mean ultimate compressive strength—no explanation given) is listed for 6 different soils as a function of moisture constants. Data are based on American and Russian literature. *Subject Headings:* **1. Soil porosity 2. Soil moisture 3. United States 4. U.S.S.R.**—*A.A.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

7.7–224 551.4 551.58:016

†Galon, Rajmund, **Rozwój geografii fizycznej w okresie dziesięciolecia Polski Ludowej.** [Development of physical geography during the decade of People's Poland.] *Przegląd Geograficzny*, Warsaw, 26(3):32–52, **1954.** bibliog. p. 46–49. Russian and English summaries p. 50–52. **DWB**—Reviews present status and achievements made during the postwar period in physical geography: 1) Geomorphology—new plans have been drawn up and complex investigations have been started by the Geographic Institute of the Academy of Sciences. 2) Climatology—in addition to E. ROMER's **New synthesis of climates of Poland,** a series of monographs on various regions with descriptions of diverse climatic elements have been issued. 3) Hydrology—a hydrologic map has been started. Only limnology has been extensively developed. Among the many new publications, **The catalogue of Polish lakes** deserves special mention. 4) Soil Geography and 5) Biogeography have been neglected. Problems which hamper progress in the field of physical geography are reviewed. Includes list of 27 papers on climatology published in various periodicals. *Subject Headings:* **1. Physical geography 2. Climatology 3. Climatology bibliographies of Poland.**—*A.M.P.*

7.7–225 551.58:519.24

Gumbel, Emil J. (*Columbia Univ.*), **Applications of the circular normal distribution.** *American Statistical Association, Journal*, 49:267–297, June 1954. 17 figs., 9 tables, 14 refs. **DLC**—The author outlines the different analytical and graphical procedures of the circular normal distribution considered for those areas in which the observations are grouped into twelve monthly periods. Its application is illustrated to numerical data such as the amounts of rainfall per month for the Esopus watershed (New York), the monthly runoff in inches for the watershed of the Derwent River (Eng.) and the mean monthly temperature for Boston, treated as a function of time. *Subject Headings:* **1. Circular normal distribution 2. Statistical methods in climatology.**—*I.L.D.*

7.7–226 551.58:6

Progress in climatological services. *Meteorological Magazine*, London, 85(1003):13–22, Jan. 1956. table, 9 refs. **DWB**—On Oct. 17, 1955, H. C. SHELLARD, opening, surveyed the scope of climatological services, and discussed examples of problems in medicine, wind pressure, accumulated temperature, etc. from the statistical point of view. The possibility of using punch cards was mentioned. A number of other speakers discussed various applications, including insurance, hydrology, insolation of buildings, etc. *Subject Headings:* **1. Applied climatology. I. Shellard, H. C.**—*C.E.P.B.*

7.7–227 551.58:001

Rein, František, **Poměr mezi methodami klasické, komplexní a dynamické klimatologie.** [Relationship of classical, complex and dynamic climatology.] *Meteorologické Zprávy*, Prague, 7(1): 1–3, Feb. 1954. 8 refs. Also: Křivský, Ladislav, **Klasická, komplexní a dynamická klimatologie.** [Classical, complex and dynamic climatology.] *Ibid.*, 7(5):127–128, 1954. 4 refs. Also: Rein, F., [**Reply**]. *Ibid.*, p. 128–129. 5 refs. **DLC**—According to S. P. KHROMOV, E. S. RUBINSHTEIN and others, KASHIN's and POGOSIAN's classification of climatology is incorrect. In the author's opinion climatology may be divided into two schools, namely classical and dynamic climatology. Complex climatology is not an independent school but merely a working method which can be applied to both classical and dynamic climatology. Dynamic climatology is particularly useful in conjunction with synoptic meteorology and long range forecasting. *Subject Headings:* **1. Dynamic climatology 2. Complex climatology 3. Definitions.**—*Trans. of author's abstract.*

CLIMATE OF PARTICULAR PLACES

See also: **Climatological atlas of Brazil** (Brazil. Conselho Nac. de Geografia), 7.7–9; **Climate of Portugal** (Ferreira), 7.7–11.

7.7–228 551.582.1(728.1)

*Dalmat, Herbert T. (*Lab. of Tropical Diseases, Nat. Inst. of Health*), **The black flies (*Diptera, Simuliidae*) of Guatemala and their role as vectors of Onchocerciasis.** *Smithsonian Miscellaneous Collections*, Wash., D. C. April 5, 1955. 125 p. numerous figs. (incl. photos), tables. **DWB**—p. 7–11, **Geography and climate of Guatemala.** In the brief discussion on geography and climate, the effect of aspect on rainfall, and of altitude on temperature are brought out, supported by some quantitative data from 4 stations ranging from 3 to 7735 ft above sea level. Annual rainfall as low as 6" in a year (Motagua Valley) and as high as 390" at Malacatón (San Marcos) in S.W. Guatemala in 160 days of 1945 has been recorded. On p. 320–326 is a discussion, with detailed tables of data, of the effect of relative humidity, temperature and of both, on biting habits of the black fly. *Subject Headings:* **1. Climate of Guatemala 2. Altitude effects on temperature 3. Guatemala.**—*M.R.*

7.7–229 551.582.2(45)

*Carrante, Vicenzo (*Dir. Agri. Experimental Station, Bari*), Della Gatta, L.; Lopez, G. et al., **I terreni agrari della Provincia di Potenza.** [Agricultural lands in the Province of Potenza.] Reprint from *Annali della Sperimentazione Agraria*, Rome, n.s., vol. 8, 1954. 105 p. 12 figs. (incl. photos), 12+10 tables, 8 refs. **DWB**—The main features of the climate, from the point of view of agriculture, of the province of Potenza (6,000 sq km, 140 km long, 45 km wide) which forms the western half of the Compartimento of Lucania

(S.E. of Naples) are discussed and illustrated with graphic and tabular data on p. 3–14. The province is located in the interior of the peninsula but is influenced by air masses from the Tyrrhenian Sea to the southwest. Hence it is subject to very great ranges in temperature—cold winters, hot summers—and rainfall varying from 500–550 mm (N.E.), to >2,000 mm in extreme S.W. portion. Data for 58 rainfall stations enter into the detailed isohyetal chart of the province. Data are also analyzed by basins and the annual course of number of rainy days (mean maximum, mean and mean minimum) for each of 6 basins is shown graphically; also mean monthly rainfall and rainy days are given. The greater part of the rain is convective (mid-day) and the dry season is June–Aug. Percent of area getting 7 categories of rainfall are tabulated. *Subject Headings:* **1. Climate of Potenza Province, Italy 2. Isohyetal charts 3. Italy. I. Perniola, M.**—*M.R.*

7.7–230 551.582.2:639(26, 988)

*†Rodewald, Martin, **Klima und Wetter der Fischereigebiete West- und Südgrönland.** [Climate and weather in the fishing regions of West and South Greenland.] *Beiträge zum Wettergeschehen in den Nordeuropäischen Gewässern*, Hamburg, No. 3, **1955.** 98 p. 42 figs., 27 plates, 3 tables, 27 refs. **DLC**—This comprehensive monograph deals with the climate and weather of the fishing waters and the adjoining coasts of western and southern Greenland. Its contents include the following: characteristics of the individual meteorological variables, ocean currents and water temperature, weather and weather situations, ice drift, ice occurrence, the relationship of climatic change to the fishing industry, etc. Synoptic charts, diagrams and tables of data are included. Climatic charts of water temperature, fog frequency, cloudiness, wind velocity, air temperature, temperature difference between air and water, etc. are presented. *Subject Headings:* **1. Marine climates 2. Climate of Greenland Coasts 3. Fishing industry 4. Oceanographic data 5. Greenland Coasts.**—*I.L.D.*

7.7–231 551.582.2(86) 551.586:633.73

Trojer, Hans, **El ambiente climatológico y el cultivo del café en Colombia: problemas, concimientos actuales y perspectivas.** [Climatological environment and the cultivation of coffee in Colombia. Problems, present-day knowledge and the future.] *Centro Nacional de Investigaciones de Café, Chinchina, Colombia. Biblioteca, Boletín Informativo*, 5(57):22–37, Sept. **1954.** 6 tables, graphs, diagr., 6 refs. **DWB**—A detailed study of rainfall and temperature variations with latitude, altitude, and time of year, based on 12 years of record. One chart shows the latitudinal-seasonal variation in rainfall from 1° to 11°N, graphically. It can be seen how the autumnal wet season (Oct. and Nov.) remains almost constant in duration and intensity with latitude, but the vernal season varies widely and drifts from Feb.–March at 2°N to May–June at 7°–8°N, and the two seasons merge into one (July–Nov.) north of 8°N. Also there is extreme variability, possibly due to short record. Rainfall increases with altitude to 1500 m and then decreases. Temperature normals depend a lot on method of computation as can be seen by a graphical (and tabular) comparison of the mean daily temperature calculated by three methods: 1) (X+N)/2, 2) [7h+14h+(20h×2)]/4 and 3) (7+13+17h)/3. The second method gives values 1.0° to 2.0°C lower than the other two methods do. Other climatic elements and effect on coffee growing are discussed. Mean humidity calculated from 7, 14 and 20h differs by an average of 6% from that calculated from 7, 13 and 17h/3. *Subject Headings:* **1. Climate of Colombia 2. Precipitation singularities 3. Mean temperature calculations 4. Coffee cultivation 5. Colombia.**—*M.R.*

CLIMATIC CHANGES

7.7–232 551.583.13:551.589.5

Heckert, L. (*Central Met. Obs., Potsdam*), **Klimaänderungen und Singularitäten.** [Climatic changes and singularities.] *Zeitschrift für Meteorologie*, Berlin, 9(1):1–14, Jan. **1955.** 2 figs., 3 tables, 3 refs. **DWB, DLC**—A distinction is made between persistent and nonpersistent singularities. The majority of weather regularities belong to the latter type and are the result of climatic variability. The choice of time intervals and the inherent climatic variation prevent statistical verification of the reality of singularities. Using nonpersistent singularities based on ten year periods, the author analyzes the relationship between calendar day and weather singularity, and that between the former and singularities based on longer time

intervals, the nature of variable singularities and the problem whether mean value or frequency singularities should be used. The author presents singularity curves for early winter (high pressure over Central Europe, temperature drop to severe frost, precipitation deficiency—usually 20–23 Dec.); Christmas weather (maximum of climatic activity in all climatic elements on Dec. 30, temperature rise, pressure fall, increase in precipitation, etc.); early spring (high pressure situation March 13–22); early summer (three alternating waves of cyclonic activity at beginning of June, June 12–14, June 26–29, general temperature and pressure recessions, increase of precipitation, etc.; and mid summer (tendency to high pressure on July 12–13, and of July and Aug. 10 extensive monsoon waves on July 5–11, July 19–29, Aug. 5–7 and 15). The relationship of these singularities to climatic variation is discussed. *Subject Headings:* **1. Singularities 2. Climatic variations.**—*I.L.D.*

7.7–233 523.6:551.583.2

Link, F. and Linková, Z. (*both Astron. Inst., Prague*), **Évidences cométaires des variations des climats.** [Cometary evidence of climatic variations.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 6(1):6–12, **1955.** 4 figs., 3 tables, 5 refs. Russian summary p. 12. **DLC.** Also: **Comets and climatic change.** *Nature*, London, 176(4494):1152–1153, Dec. 17, 1955. **DWB**—A method is advanced for deriving historic climatic records from the number of comets observed during each solar cycle. The method is based on the assumption that the number of comets observed depends on three factors: 1) actual number of comets approaching the earth, 2) meteorological conditions and 3) astronomical activity. The first factor may be considered as constant and the last as continuously rising, especially if the activity of the civilized world is taken as a whole; thus the number of comets observed may be brought into direct relationship with meteorological conditions. A climatic record is worked out for the 5th through 18th centuries and compared (with good general agreement) with the historic rainfall record of C. E. P. Brooks. *Subject Headings:* **1. Comets 2. Historical climates.**—*G.T.*

7.7–234 551.583.3

†Antevs, Ernst, **Climatic changes and pre-white man.** *Utah. Univ. Bulletin*, 38(20): 168–191, June **1948.** 99+refs. **DLC**—The climatic conditions in the Great Basin during the Quaternary were influenced greatly by the glaciation in Western Canada and adjacent parts of the United States. Pluvials and interpluvials in the Great Basin corresponded to glacials and interglacials in the north. The climatic conditions and changes in the Great Basin during the ages corresponding to the last main glacial, the Wisconsin, and the Postglacial cover in a general way the Quaternary since the beginning of glaciation. The discussion includes an account of the West Canadian ice sheet and the Great Basin pluvials with special reference to the prevailing climatic conditions, the Bonneville and Provo pluvials and the postpluvial or neothermal, including the various age divisions such as the anathermal, albethermal and medethermal. The evidence for the presence of man during the Provo Pluvial and in the neothermal is summarized. *Subject Headings:* **1. Climatic changes 2. Glacial periods 3. Great Basin.**—*I.L.D.*

7.7–235 551.583.3:581.9:634.94(57)

†Tanfil'ev, Gavriil Ivanovich, **Predely lesov v poliarnoĭ Rossii po issledovaniiam v tundre Timanskikh samoedov.** [Forest limit in Arctic Russia according to studies made in the tundra of the Timan Samoyeds.] (In his: **Geograficheskie raboty.** Moscow, Gos. Izdat. Geograf. Lit., **1953.** p. 123–226. figs., tables, numerous foot-refs.) Sec. 8, p. 189–226: **Kolebaniia klimata v posledniekovuiu epokhu.** [Climatic fluctuations in the postglacial epoch.] **DLC**—This article first appeared in 1911. The author reviews the literature on the climatic changes in Europe during postglacial time and the relationship of the various climatic changes to the origin of peat and tundra is considered. *Subject Headings:* **1. Postglacial climates 2. Forest limits 3. Siberia.**—*I.L.D.*

7.7–236 551.583.3:581.16 529:551.7

Zumberge, James H. (*Mich. Univ.*) and Potzger, J. E. (*Butler Univ., Indianapolis*), **Pollen profiles, radiocarbon dating, and geologic chronology of the Lake Michigan Basin.**

Science, 121(3139):309–311, Feb. 25, 1955. table, 2 refs. **DLC**—Wave action of the high water stage of Lake Michigan during the last three years cut deeply into flanking dunes along the eastern shore and uncovered a 30-in. layer of compacted peat perched on a 5-ft layer of sand and covered by a 23-ft dune. The vertical cut of the peat permitted easy sampling at 1-in. intervals for pollen analysis. A trench dug to a depth of 75-in. into the sand underlying the compacted peat terminated in a layer of blue silt capped by a layer of wood. Samples were taken of the blue silt and of all organic streaks in the 15-in. layer of sand. They all contained sufficient pollen for a pollen analysis and determination of the forest history. The 30-in. of peat records four major forest changes and an equal number of intermediate changes. Radiocarbon dating by the Univ. of Michigan Lab. gave the placement of forest changes and showed that during the past 4,000 years the climate optimum continued to develop, as shown by increase of oak, hickory and pine and that in most recent times climatic deterioration occurred during which change pine has increased in abundance. *Subject Headings:* **1. Pollen analysis 2. Radiocarbon dating 3. Geochronology 4. Lake Michigan Basin.**—*A.M.P.*

MICROCLIMATOLOGY

See also: **Field microclimatology** (Krečmer), 7.7–70; special bibliography on **Snow micrometeorology**, p. 873.

7.7–237 551.584.3:551.525.4

Gol'tsberg, I. A., **Mikroklimaticheskie osobennosti osushennykh bolot.** [Microclimatic characteristics of drained swamps.] *Meteorologiia i Gidrologiia*, No. 2:13–17, March/April, **1955.** table. **DLC**—The author summarizes the results of a study of the microclimatic characteristics of drained swamps, used for farming, carried out by the A. I. Voeĭkov Central Geophysical Observatory and the Institute of Reclamation of the Academy of Sciences of the Byelorussian SSR. The effect of the water and heat regime of peat soils upon microclimate and the relationship between the resulting microclimate and agriculture are considered. A table showing the air temperature at the grass level and soil temperature at a depth of 10 cm is presented. *Subject Headings:* **1. Soil microclimatology 2. Agricultural climatology 3. Soil temperatures 4. Reclaimed swamps 5. U.S.S.R.**—*I.L.D.*

7.7–238 551.584:551.579.4(58)

Rode, A. A., **Opyt osvoeniia tselinnykh zemel' v polupustyne Prikaspiĭskoĭ Nizmennosti.** [Experiment of utilization of virgin soils in the semidesert of the Transcaspian Lowland.] *Priroda*, Moscow, 44(1):60–66, Jan. **1955.** 7 figs. **DLC**—A description of the climate of the Transcaspian region giving salient meteorological data and a graph showing the annual variation of air temperature and relative humidity, of the relief, soil and vegetation cover, of the soil moisture supply from snow and the distribution of soil moisture. *Subject Headings:* **1. Soil microclimatology 2. Climate of Transcaspian Region 3. Soil moisture 4. Transcaspian Region, U.S.S.R.**—*I.L.D.*

7.7–239 551.584.1:551.524.1:551.554:551.571.1

Halstead, Maurice H., **Micrometeorological implications of some experimentally determined rates of transfer of heat, water vapor and momentum.** Paper presented at the 136th National Meeting of the American Meteorological Society, Wash., D. C., May 5, **1955.** 19 p. 15 figs., 5 refs., eqs.—Computations of the convective flux of heat and of water vapor from hourly measurements of wind, temperature and humidity profiles agree satisfactorily with independent measurements of heat available from radiation and soil conduction. A study of these data demonstrates some of the important interrelationships which exist among the micrometeorological variables, soil moisture and solar radiation. An electronic simulator type computer has been built which reproduces some of these interrelationships. *Subject Headings:* **1. Micrometeorology 2. Profiles of meteorological elements.**—*Author's abstract.*

7.7–240 551.584.3:551.525.4

Matsubara, Shigeru and Nakatao Tetsuro (*Faculty of Science, Okayama Univ.*), **Report of the microclimatic observations on high mountains.** *Journal of Agricultural Meteorology*,

Tokyo, 8(12):52–54, March 1953. 3 figs., 6 tables. In Japanese; English summary p. 54. **MH-BH**—The heat flow into the earth was studied on the basis of microclimatic observations carried out near mountains and sea shores. On the assumption of the thermal diffusivity the earth, temperature is expressed by the equation

$$O = R_0 + R' \sin [\omega t + \gamma \sin (\omega t + \delta) + \delta'].$$

Subject Headings: **1. Microclimatology of mountains 2. Microclimatology of seashore 3. Thermal diffusivity of soil.**—*I.L.D.*

7.7-241 551.584.4:551.579.5

Schlüter, Heinz, **Ein Beitrag zur mikroklimatischen Differenzierung von Pflanzenstandorten.** [Contribution to the microclimatic differentiation of plant stands.] *Wetter und Leben*, Vienna, 7(5/6):114–122, **1955.** 2 figs., table, 6 refs. **DLC, DWB**—Microclimatic measurements for characterizing the continentality of stand conditions were made in grass and forest associations situated on soil independent of ground water. Extreme maximum and minimum temperatures of superficial soil layer measured at various intervals during the growing period provide adequate data on the differentiation of thermal conditions as a result of exposure and slope. The temperature characteristics of open grass stands and a relatively dry forest associations of oak-hornbeam are presented. Measurements of the daily march of evaporation, and air and soil temperature reveal the differences in plant stands resulting from soil moisture content. *Subject Headings:* **1. Forest microclimatology 2. Soil moisture effects.**—*I.L.D.*

7.7–242 551.584.61(436)

Nidetzky, L., **Untersuchungen der relativen Luftfeuchte in den Räumen der neuen Grazer Universitäts-Hauptbibliothek.** [Investigation of relative humidity in the new central library of Graz University.] *Wetter und Leben*, Vienna, 6(10/12):220–222, **1954. DWB**—The author discusses the relative humidity and temperatures prevailing in the library under conditions of closed windows and doors, after opening windows on both sides of the basement floor, and after installation of a fan. *Subject Headings:* **1. Indoor humidities 2. Indoor temperatures 3. Graz, Austria.**—*I.L.D.*

CLIMATIC CLASSIFICATION

7.7–243 551.585(674)

Sillans, Roger, **A propos des limites de quelques climats de l'Afrique Centrale française.** [A few climatic boundaries in French Central Africa.] *Académie des Sciences, Paris, Comptes Rendus*, 240(4):452–453, Jan. 24, **1955. DWB**—In the course of his research on the vegetation of Ubangi-Shari, the author noted two climatological facts: 1) the probable existence of an intermediate climate between the typical Ubangi subclimate and the equatorial subclimate of the Congo and 2) the necessity of a revision of the northern limits of the Ubangi and of the Sudano-Ubangi subclimates. *Subject Headings:* **1. Climatic types 2. French Equatorial Africa.**—*G.T.*

7.7–244 631.42:551.585.5:551.311

Shchukin, I. S., **Morfologiia nekotorykh rykhlykh obrazovanii v gornykh stranakh kontinental'nogo klimata.** [Morphology of friable soil structures in mountainous lands with continental climate.] *Voprosy Geografii*, No. 35:29–45, **1954.** 6 figs., 4 refs. **DLC**—The role of maritime and continental climates in the formation of relief features are compared. The morphological characteristics of friable structures which can be explained only by the action of the dry continental character of southeast Central Asia are described. The features discussed are as follows: moraine hummocks of a thermal karst relief, moraine terraces, earth pyramids, cones of detritus, etc. *Subject Headings:* **1. Soil structure 2. Continental climates 3. Erosion.**—*I.L.D.*

BIOCLIMATOLOGY

See also: **Weather of 1954 and Scottish farmer** (Wannop), 7.7–84; **Climatological environment and coffee cultivation** (Trojer), 7.7–231.

7.7–245 551.586:597.6

Kontaxis, Nicholas E.; Maher, John R. (*both, 6th Army Medical Lab., Ft. Baker, Calif.*) and Pickering, Donald E. (*Univ. of Calif. Medical Center, S. Francisco*), **Effects of temperature, light and nutrition on the sensitivity of the male *Rana pipiens* to exogenous chorionic gonadotropin.** *Science*, Wash., D. C., 121(3151):729–730, May 20, **1955.** fig., table, 11 refs. **DLC**—Tabulated results of experiments with frogs show that male *R. pipiens* ought to be maintained at refrigerator temperature under constant illumination and in a state of good nutrition for maximum sensitivity to exogenous chorionic gonadotropin. Dose-response curves showing percentage positive response versus concentration of injection give evidence that light rather than temperature affects the sensitivity. *Subject Headings:* **1. Animal ecology 2. Temperature effects 3. Frogs.**—*W.N.*

7.7–246 551.586:613

Grushko, IA. M. (*Irkutsk Med. Inst.*), **Osnovopolozhnik otechestvennoĭ klimatologii A. I. Voeĭkov i znachenie ego trudov dlia gigienicheskoĭ nauki.** [Founder of Russian climatology: A. I. Voeĭkov and the importance of his work for the science of hygiene.] *Gigiena i Sanitariia*, Moscow, No. 8:31–35, Aug. **1955.** 7 refs. **DLC**—A brief summary of the principles of physical climatology established by VOEĬKOV is presented and their application to sanitation and hygiene is discussed. These include the concept of microclimate and its possible control by human intervention such as drainage and shelter belts. VOEĬKOV's interest in water sanitation, in regulation of water flow, in medical climatology, etc. are mentioned. *Subject Headings:* **1. Physical climatology 2. Microclimatic control 3. Voeĭkov, A. I.**—*I.L.D.*

7.7–247 551.586:616

Kaiser, M., **Virusinfekte und Wetter.** [Virus infections and weather.] *Wetter und Leben*, Vienna, 6(10/12):222, **1954.** **DWB**—A quotation from the article **Zur Frage der Encephalitis post vaccinationem.** [Encephalitis following vaccination.] By Albert Hofbauer. *Zeitschrift für Kinderheilkunde*, 10(3/4), **1954.** The virus infections manifest a distinct relationship to weather. The cases recorded appeared in localities at the same elevations situated in winter at the upper boundary of the ground fog and in summer are subject to the influence of the föhn wind. *Subject Headings:* **1. Bioclimatology 2. Föhn effects 3. Fog effects 4. Virus infections.**—*I.L.D.*

7.7–248 551.586:697

Band, Günther, **Über die Wirkungsweise von Lufttoren.** [On the working of ventilators.] *Meteorologische Rundschau*, 8(11/12):195–199, Nov./Dec. **1955.** 6 figs., table. **DLC**—Three ventilation systems, similar in principle, were tested. A turbine under the ventilator drives warmed filtered air inwards and then upwards on either side. The temperature and air movement distributions (outdoors and hall) are plotted. It is found that cold air can enter at the sides through turbulence; suggestions are made for minimizing this. *Subject Heading:* **1. Heating and ventilating.**—*C.E.P.B.*

ENVIRONMENTAL INFLUENCES

See also: **Local temp. variations** (Reynolds), 7.7–163.

7.7–249 551.588.6

Inoue, Katsura and Ohta, Iwao (*Govt. Forest Exp. Station*), **On the results of the meteorological observation on the denuded mountain of the Setonai-Kai District.** *Journal of Agricultural Meteorology*, 9(2):49–52, March **1954.** In Japanese; English summary p. 52. 3 figs., 2 tables, refs. **MH-BH**—A study of the meteorological conditions prevailing during Feb. and Aug. 1952 in a denuded area in the Kojima district facing the Setonai-Kai. *Subject Headings:* **1. Deforestation 2. Meteorological influences 3. Setonai-Kai District, Japan.**

SYNOPTIC CLIMATOLOGY

See: **Synoptic weather conditions** (Kuvshinova), 7.7–90; **Climatic changes and singularities** (Heckert), 7.7–232.

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Meteors** (Kaiser), 7.7–1.

7.7–250 551.590.24:551.510.535:551.594.7

Ghose, A. K.; Roy, K. M.; Gupta, S. K. et al., **On radio measurements at Jabalpur during the solar eclipse of June 30, 1954.** *Institution of Telecommunication Engineers, New Delhi, Journal*, 1(1):20–26, March **1955.** 5 figs., 4 refs. **DBS**—Observations were made from June 27–July 1, 1954 (5 days) at Jabalpur, India, on: 1) field strength of Moscow Radio (20 m), 2) angle of incidence of reflected wave of Moscow Radio, and 3) intensity of atmospheric noise at 0.6 mc/s from direction of belt of totality. Observations on other than eclipse dates are used as control. Path to Moscow was 5,000 km. Shadow belt lay between 2 points. Records show increase in field strength (rapid at time of eclipse, reaching 2nd point of reflection) then sudden drop, then sudden rise accompanied by severe fading. Unstable F2 conditions are due to rapid succession of events at time of eclipse. Double hop transmission changed to single hop and vice versa between 1827 and 1927 of I.S.T. Noise level was higher than normal and angle of reflected ray varied more on eclipse day than normal. *Subject Headings:* **1. Eclipse effects on ionospheric reflection 2. Solar eclipse, June 1954 3. Jabulpur, India I. Das Gupta, S. M. II. Sarwate, V. V. III. Mithal, G. K.**—*M.R.*

7.7–251 551.590.25:551.577.32(54)

Bhalotra, Y. P. R., **Influence of meteoric dust on rainfall.** *Weather*, 11(2):48–51, Feb. **1956.** table, 7 refs. **DWB**—E. G. Bowen's suggestion that peaks of average daily rainfall appear about 30 days after meteor showers is examined for a number of stations in India and not confirmed. Peaks are due to a few individual cyclonic rains and in most cases show no relation to Bowen's dates. *Subject Headings:* **1. Meteor influences 2. Rainfall periodicities 3. India.**—*C.E.P.B.*

OPTICAL PHENOMENA

See also: **Refractive index forecasting** (Cowan), 7.7–12; **Refractive index profiles** (Cowan), 7.7–18; **Harmattan haze** (Condron), 7.7–178.

7.7–252 535.4:551.593.1

Dubin, Maurice, **Index of refraction above 20,000 feet.** *Journal of Geophysical Research*, 59(3):339–344, Sept. **1954.** table, 7 refs., eqs. **DLC**—A survey of equations for the computation of the refractive index lead to a simplified formula which shows that above 7 km the density of air alone is important, if an accuracy up to 10^{-5} is desired. The effect of water vapor can be neglected above this height, as well as the density of the air above 26 km and the electron concentration in the ionosphere for frequencies up to 5,000 Mc/sec. *Subject Headings:* **1. Refractive index 2. Stratosphere 3. Upper atmosphere.**—*A.A.*

7.7–253 551.593.1:526.9:551.524.4(52)

Harada, Y.; Tsuchihashi, T. and Ōno, K., **Atmospheric refraction at Mt. Tsukuba. Japan.** *Geographical Survey Institute, Bulletin*, 4(1):59–68, March **1954.** 7 figs., 2 tables, 5 refs., 4 eqs. **DWB**—For the purpose of studying the effect of atmospheric refraction on geodetic triangulation, field observations were carried out in Nov. 1952 and in Aug. 1953, in the vicinity of Mt. Tsukuba in Kanto District. The daily changes in the zenith were found to be rather systematic. The daily changes for the two epochs were nearly the same in phases, but different in amplitudes. The maximum amplitude in zenith distance at Tateno station was about 100″ in Nov. and about 30″ in August. Comparing the observed zenith distance

with that calculated from the temperature gradient observed at Tateno Aerological Observatory, satisfactory results were obtained. *Subject Headings:* **1. Atmospheric refraction 2. Surveying 3. Temperature profiles 4. Mt. Tsukuba, Japan.**—*Authors' abstract.*

7.7–254 551.593.1:551.501.7:551.571

*Overcash, Frank J. (*Aircraft Radiation Lab., Wright Air Dev. Center*), **Index of refraction measurement with an airplane psychrograph.** *U. S. Air Force, AF Technical Report*, No. 6621, Aug. 1951. 38 p. 33 figs., 10 refs. **DWB**—An airplane psychrograph was used by the Aircraft Radiation Laboratory of Wright Air Development Center to obtain accurately the atmospheric index of refraction up to 10,000 ft in the Dayton, Ohio, area. Complete details of its use are given, with curves of experimental results. This instrument makes a continuous recording of the fine detail of the wet bulb and dry bulb temperature above freezing, which is used with pressure to calculate index of refraction. These data show that the index profile follows closely the wet bulb temperature profile in the Dayton, Ohio, area in the summer months. Index lapse rates greater than $30(n-1)10^6$ units per 100 ft were recorded at 7,000 ft. Actual index curves that conform approximately to what has been considered the standard were found to be the exception rather than the rule. *Subject Headings:* **1. Refractive index 2. Airplane psychrographs.**—*Author's abstract.*

7.7–255 551.593.1:656.6

Shufeldt, H. H., **Irradiation and refraction at low altitudes and the working navigator.** *Navigation*, Los Angeles, Calif., 4(2):86–91, June 1954. 4 figs., 3 refs. **DWB**—Low altitude sights of the sun, taken under any but the most adverse weather conditions (inversions) give satisfactory results in navigation (position error within 2 mi), if corrections are introduced for refraction, sea-air temperature difference and for irradiation. Results of several hundreds of measurements are shown. A nomogram is given for corrections due to barometric pressure and air temperature. *Subject Headings:* **1. Atmospheric refraction 2. Navigation.**—*A.A.*

7.7–256 551.593.5

Red flash at moonrise [in] Indian Ocean. *Marine Observer*, 26(171):16, Jan. 1956. **DLC**—March 19, 1955, 1°30′S, 63°42′E, the moon apparently split in two, leaving a small image on the horizon, and a bright crimson flash appeared. *Subject Headings:* **1. Red flash 2. Indian Ocean.**—*C.E.P.B.*

7.7–257 551.593.5:551.575.1:551.578.4

*Thuman, William C.; St. John, Gilbert A. and Poppoff, Ilia G., **Studies of the intensity of light scattered by water fogs and ice aerosols.** Stanford Research Institute, California, Contract AF 19(122)-634, Scientific Report, No. 5 (Report, No. 18), March 28, 1955. 45 p. 21 figs. (incl. photos), 20 refs. **DWB**—In the course of an investigation of ice fog in Alaska, it was necessary to determine the physical state of the free-floating fog particles. Preliminary experiments indicated that the relative intensity of light scattered in a horizontal plane was different for supercooled water fogs and fogs consisting of well formed crystals. This difference was most apparent in the region of 145-degree backscattering. An instrument was developed which would record the ratio of the intensity of light scattered at horizontal angles between 15° and 165° to the intensity of light scattered at 90°. Tests of the relative intensity of scattered light were conducted in Alaska during the winter of 1953-54. Subsequent to the field operations, tests on supercooled water fogs and simulated ice fogs were conducted in a large cold chamber. The results indicated that the ice fog *in situ* was indeed particulate ice. For both supercooled water fogs and simulated ice fogs, higher values of the relative intensity of scattered light were associated with corresponding smaller mean particle diameters. There was a relationship between the temperature and the time necessary for a fog in the cold chamber to change completely to ice, a shorter time being necessary at lower temperatures. *Subject Headings:* **1. Ice fog 2. Scattering of light through fog 3. Alaska.**—*Authors' abstract.*

7.7–258 551.593.54

Götz, F. W. Paul and Volz, Fr. (*Lichtklimatische Observ., Arosa*), **The blue sun of September 1950.** *I.U.G.G. Association of Meteorology, Brussels, 1951, Procès-Verbaux des*

Séances, Mémoires et Discussion, p. 216–219. pub. Brussels, **1953.** 2 figs., 5 refs. **DWB**—Extensive forest fires in 1950 in Canada caused increased turbidity over a large part of the Northern Hemisphere, which was responsible for the phenomenon of the blue sun and the development of a Bishop's ring. Sky brightness was measured as a function of the angle of scattering, giving $p=0.5\mu$ as the best estimate for the size of the turbidity particles. Measuring the discoloration of the sunlight and observing the abnormal extinction, 0.5–0.8μ was found for the size of the particles. In addition, the total amount of turbidity particles could be determined. *Subject Headings:* **1. Blue sun—Sept. 1950 2. Turbidity 3. Forest fires 4. Canada.**—*A.A.*

7.7–259 551.593.63

Double solar halo [in] Caribbean Sea. *Marine Observer*, 26(171):13, Jan. **1956.** fig. **DWB**—Feb. 19, 1955, two intersecting 22° halos, one centered on sun, the other slightly to one side. [Possibly a 22° halo and circumscribed elliptical halo.] *Subject Headings:* **1. Halo observations 2. Caribbean Sea.**—*C.E.P.B.*

7.7–260 551.593.63

Eldridge, R. H., **Halo phenomena at Accra on 9 July 1955.** *Weather*, 11(1):20–21, Jan. **1956.** fig. **DWB**—Sketch shows 22° halo, elliptical halo, mock suns, parhelic circle, infralateral arcs of 46° halo and two white arcs intersecting parhelic circle, no reference to which could be found in the literature. *Subject Headings:* **1. Halo observations 2. Accra, Gold Coast.**—*C.E.P.B.*

7.7–261 551.593.63

Lunar halo [in] North Atlantic Ocean, Gulf of Guinea, Western Mediterranean, North Pacific Ocean. [and] Lunar phenomenon [in] North Atlantic Ocean. *Marine Observer*, 26(171):13–15, Jan. **1956.** fig. **DLC**—Jan. 2, 1955, 21°33′N, 57°W, lunar halo of radius 27½°. March 6, 1955, 4°26′N, 2°52′W, lunar halo of radius 24° increasing to 30°. Jan. 7, 1955, 36°2′N, 3°34′W, halos of 24° and 7°. Jan. 9, 1955, 40°46′N, 161°32′E, halo of radius 16°. March 6, 1955, 47°43′N, 35°57′W, brightly colored lunar cross and corona. *Subject Heading:* **1. Lunar halos.**—*C.E.P.B.*

7.7–262 551.593.63

Schubert, Günther, **Die Schweriner Halophänomene vom 26. und 27. April 1955.** [The Schwerin halo phenomena of April 26 and 27, 1955.] *Zeitschrift für Meteorologie*, 9(9):285, Sept. **1955.** 3 figs. *Also:* Gäbler, H., **Auffällige Häufung umschriebener Halos.** [Remarkable frequency of circumscribed halos.] *Ibid.*, 285–286. 3 figs. **DLC**—Schubert illustrates 22° halo, parhelia and circumscribed halo at 8.30 and 9.30 h on April 26 and 12.45 h on April 27. Gäbler illustrates development of circumscribed halo on April 26 and "horned" appearance on April 3 (solar elevation 25°). *Subject Headings:* **1. Halo observations 2. Germany.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

See also: **Refractive index profiles** (Cowan), 7.7–13; **Atmos. electricity** (Kühn), 7.7–127; **Ionospheric radio wave propagation** (Morgan), 7.7–130; **Eclipse effects on ionospheric reflection** (Ghose et al.), 7.7–250.

7.7–263 551.594

Israël, H., **Luftelektrische Erfahrungen in den Polargebieten.** [Atmospheric electrical experiences in the polar regions.] *Polarforschung*, Kiel, [Ser.] 3, 23(1/2):210–215, **1953.** 4 figs., 10 refs. **DWB**—Development of theory of earth's charge resulting from observations of H. Benndorf in Siberia in 1899–1900 is summarized. Observations in Lapland, Cape Evans and other polar stations showed that diurnal variation of potential gradient depends on universal, not local time. The same peculiarity is also shown by the oceans and by the nonpolar continents. This is related to the diurnal variation of world thunderstorm activity due to the distribution of land and sea. *Subject Headings:* **1. Atmospheric electricity 2. Polar Regions.**—*C.E.P.B.*

7.7–264 551.594.1/2:551.501

Israël, H., **An experimental problem in the atmospheric-electrical synopsis: the separation of conduction current and Maxwell's displacement current in measurements of the air-earth current.** *Journal of Atmospheric and Terrestrial Physics*, 6(6):322–327, June **1955.** 7 figs., 8 refs., 8 eqs. **DWB**—By using a network of stations and measuring potential gradient, air-earth current and/or specific resistance simultaneously, conduction currents can be separated from convection currents. The method, based on that of H. W. Kasemir, for measuring the atmospheric-electric field and air-earth current is described. Specimen records are shown. *Subject Headings:* **1. Atmospheric electricity measurement. I. Kasemir, H. W.**—*C.E.P.B.*

7.7–265 551.594.13:551.510.535:550.38:551.507.362

Singer, S. F. (*Physics Dept., Md. Univ.*), **Rocket exploration of magnetic fields and electric currents in the upper atmosphere.** (In: Boyd, R. L. F.; Seaton, M. J. and Massey, H. S. W. (*eds.*), **Rocket exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 256–260. figs., 16 refs.) **DWB**—Tidal winds in the conducting layers of the earth's atmosphere produce e.m.f.'s, and therefore a current system which is responsible for many of the geomagnetic variations observed at sea level. Rocket measurements at the magnetic equator have now established the existence of this current in the lower E layer of the ionosphere. [1] Because of the insufficient conductivity of even the whole atmosphere in the presence of a transverse magnetic field it has always been difficult to account for the current on the basis of a theory which does not require excessively high wind velocities. The experimental results show that the current is distributed in only a very narrow layer, extending from 93–105 km. [2] This finding forces a reconsideration of the theory of ionospheric conductivity. It leads to the suggestion that by means of Hall polarization, which is set up perpendicular to the electric field and the earth's magnetic field, the conductivity at the equator is restored to the original high value which would exist in the absence of the magnetic field. In this way it is now possible to account for the ionospheric current system without invoking the presence of extremely high winds, i.e. velocities much greater than 100 km/hr. *Subject Headings:* **1. Ionospheric conductivity 2. Magnetic field 3. Rocket investigations 4. Ionospheric currents.**—*Author's abstract.*

7.7–266 551.594.2

Tamura, Yuichi (*Geoph. Inst., Kyoto Univ.*), **An analysis of electric field after lightning discharges.** *Journal of Geomagnetism and Geoelectricity*, Kyoto, 6(1):34–46, March **1954.** 5 figs., 2 tables, 10 refs., 30 eqs. **DLC.** Also in: *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 42:190-200, Nov. **1955.** 5 figs., 2 tables, 10 refs., 30 eqs. **DLC**—The analysis of the electric field after a lightning discharge is based on a following set of simple assumptions. A thundercloud is represented by a vertical dipole of positive polarity. The electrical conductivity of the atmosphere increases exponentially with height, and is not altered by the presence of the thundercloud. The electromotive force in the thundercloud is represented by a constant current generator. It is assumed that an electric field consists of three parts. The first is the field due to charge in each pole which increases at a rate depending on electrical conductivity of the air at a height of the pole; the second, due to space charge which grows with charges in the poles; the third, due to free decaying space charge which is released after a lightning discharge. Characteristic dissimilarity of the form of the field recovery curve, observed after a near discharge to that of distant discharge, is well interpreted by this analysis. *Subject Headings:* **1. Thunderstorm electric field 2. Lightning discharge effects.**—*Author's abstract.*

7.7–267 551.594.22:537.3

Srivastava, C. M. (*Imperial College of Sci. and Tech., London*) and Khastgir, S. R. (*Banaras Hindu Univ., Banaras*), **On the maintenance of current in the stepped leader stroke of lightning discharge.** *Journal of Scientific and Industrial Research, Sec. B*, New Delhi, 14(1):34–35, Jan. **1955.** 5 eqs., 3 refs. **DWB**—A brief theoretical attempt to explain the maintenance of the current (I) which produces the I-R drop (R = increased resistance of the channel) responsible for the stepped leader stroke. This is considered as a function of the photo-electrons liberated by photons impinging on the cloud from which the initiating electrons have started the avalanche in the channel. *Subject Headings:* **1. Lightning 2. Electric current.**—*W.N.*

7.7–268 551.594.223

Berlage, H. P., **Van bliksemballen naar lichtgevende aardappels en weer terug.** [Ball lightning, luminescent potatoes and weather.] *Hemel en Dampkring*, 53(4):65–70, April 1955. **DWB**—The author cites a detailed account of ball lightning written by E. Malhios in **La foudre ses différentes formes—la matiere fulminante,** a will o' the wisp phenomenon, and describes a series of ball lightning incidents that have occurred in the Netherlands over a period of years. Several theories on the origin of ball lightning are summarized. *Subject Headings:* **1. Ball lightning 2. Netherlands.**—*I.L.D.*

7.7–269 551.594.223

Nauer, Herbert, **Wie entsteht ein Kugelblitz?** [How does ball lightning originate?] *Umschau*, 56(3):75–77, Feb. 1, 1956. 5 figs. **DLC**—The varied characteristics of ball lightning and the theories about it are described. Similar phenomena have been produced by point discharges. Other theories refer to masses of charged water vapor, initial discharges between electrodes, and burning gas balls. The reasons for the rarity of ball lightning are discussed. *Subject Heading:* **1. Ball lightning.**—*C.E.P.B.*

SFERICS

7.7–270 551.594.6:551.594.221:551.501.83

Hill, E. L. (*Univ. of Minnesota*), **The low frequency electromagnetic radiation from lightning strokes.** (In: Conference on Radio Meteorology, Nov. 9–12, 1953, Univ. of Texas, **Supplement to the Proceedings,** V. 7, pub. 1954. 3 p. 6 refs., eq.) **DWB**—Electromagnetic radiation from lightning ranges from soft x-rays to the longest known radio frequency wave lengths (27 to 41 km). Measurements of the energy of radiation in the meter and centimeter bands have never been made, but low frequency radiation (several km or longer) which produces "whistlers" is calculated from charge and current distributions in the stroke, using a simplified model. The most sensitive element of the formula is the length (h) from cloud to ground. If the currents in ground and cloud are considered (as well as the stroke), the length h can be doubled, and since the final energy varies as the 6th power of h, a value of radiation in keeping with the estimate of Laby (1940) can be obtained. *Subject Headings:* **1. Low frequency radiation from lightning 2. Sferics from lightning.**—*M.R.*

7.7–271 551.594.6:551.594.221

Newman, M. M. (*Lightning & Transients Res. Inst., Minneapolis*), **The lightning discharge propagation mechanism effect on atmospheric waveforms.** (In: Conference on Radio Meteorology, Nov. 9–12, 1953, Univ. of Texas, **Supplement to the Proceedings,** V-5, pub. 1954. 4 p. 3 figs., 2 refs.) **DWB**—The fact that a lightning stroke occurs after a progressive step-leader process has gone on for some time is important in the building up or shape of wave forms of sferics. Laboratory experiments using artificial channels and banks of condensers to simulate the several stages of a progressive stroke, and to record its effects on an oscillograph are described and illustrated along with illustrations of a complex natural horizontal type stroke. *Subject Headings:* **1. Lightning propagation mechanisms 2. Sferics wave forms 3. Artificial lightning studies.**—*M.R.*

7.7–272 551.594.6:551.501.83

Newman, M. M.; Stahmann, J. R. and Anderson, J. R. (*all, Lightning & Transients Res. Inst., Minneapolis*), **Recording and classification of thunderstorm atmospherics by counter techniques.** (In: Conference on Radio Meteorology, Nov. 9–12, 1953, Univ. of Texas, **Supplement to the Proceedings,** V. 3, pub. 1954. 9 p. 5 figs., table, ref.) **DWB**—Noise from whatever source or wave length can be measured by counter analyzers. The rate of rise, amplitude, average level and pulse repetition rate are characteristics which can be measured with some modifications for sferics over other types of noise. Models of counter analyzers are described and illustrated. Methods of measurement outlined, correlation with actual reduction in intelligibility discussed and equipment, records, and results illustrated in photographs and graphic forms. It covers a wide range of frequency and the results are easy to read and analyze. *Subject Headings:* **1. Sferics recording methods 2. Sferics classification 3. Wave form counters.**—*M.R.*

PART II. A SELECTIVE ANNOTATED BIBLIOGRAPHY ON THE MICROMETEOROLOGY OF SNOW COVER

By: *Geza Thuronyi, N. T. Zikeev and Malcolm Rigby*

INTRODUCTION

Knowledge of the thermal and optical properties of snow, or, more strictly speaking, of a snow cover, is essential for the meteorologist, the hydrologist, the glaciologist, the engineer, soil scientist and even the aviator, farmer, resort operator and forester, especially in Alpine or sub-Arctic regions where snow is a major climatic factor. It is even more important for anyone conducting operations in the Arctic, Antarctic or on the Greenland Ice Cap. Finally, it is of interest, from a purely scientific point of view, to the astrophysicist, oceanographer, crystallographer, radiation specialist and geophysicist as well as the cryopedologist. Naturally the literature on this important subject is widely scattered in the journals and monographs of many disciplines and trades, and in many languages, so that any contribution towards locating and arranging the material from the point of view of the workers in any field (such as meteorology) will result in a great saving of time in searching for literature, or a more thorough coverage of the subject for those interested in any aspect of the subject.

The entire field of snow cover could not be covered in a bibliography of less than 3,000 or 4,000 items. The excellent SIPRE Bibliography (see item 7G–3) which attempts to cover the entire field of snow, ice and frozen ground and borderline scientific or engineering material, has during the past 6 years attained an accumulation of 10 sizable volumes comprising more than 14,000 abstracts and the field is not yet exhausted.

The present bibliography, limited as it is to the thermal and optical aspects of snow cover (leaving out ice and frozen ground), arranged chronologically with a detailed subject and geographical outline, and approached from the point of view of the meteorologist rather than the cryopedologist or engineer, serves a unique purpose for those who use *Meteorological Abstracts* and who may not have the SIPRE Bibliography at hand.

We wish, however, to call the reader's attention to the fact that the SIPRE Bibliography contains scores of additional references on aspects of this subject which have been lightly touched on (e.g., thermal properties of glaciers, forest influences, temperature and density of snow cover, effect of snow cover on soil temperature or frozen ground, geographic and altitudinal distribution of snow cover, snow melt runoff, snow surveys, etc.) and that, in many cases, he will find there more quantitative information on the items which are contained hereinafter. In several cases we have used a SIPRE abstract, with due credit given.

It is hoped, however, that this bibliography will give the searcher a cross section of the world literature on the micrometeorology of snow cover published during the past century. An exhaustive search of the several good bibliographic sources marked (†) will give an even better coverage of the field or any part thereof.

It will be noted in the following subject outline that the albedo of snow cover has been given unusually great stress and that a great deal of the Russian literature has been included. This emphasis is largely due to the fact that literature of these types has been largely neglected in western meteorological articles or bibliographies.

We wish to express appreciation for the suggestions and additional items furnished by Dr. David Miller of the Quartermaster Research and Development Command, to Dr. C. E. P. Brooks who went over the preliminary list of references, and to Mr. John C. Sherrod, Jr. of the Library of Congress, and the Snow, Ice and Permafrost Research Establishment, who made it possible for us to use the SIPRE Bibliography and Indexes for checking and filling out the present compilation.

An additional 75 items which came to our attention (or were located) too late for inclusion in the present issue will be published in Part II of the next (August 1956) issue of *Meteorological Abstracts*.

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MAJOR BIBLIOGRAPHIC SOURCES

7G–1 551.5:01

†U. S. Signal Corps, **Bibliography of meteorology.** A classed catalog of the printed literatu of meteorology from the origin of printing to the close of 1881; with a supplement to the close 1887 (v. 3–4, 1889) and an author index. Edited by Oliver L. Fassig. Wash., D. C., **1889–189** 4 v. (v. 1, 1889, v. 2–4, 1891) Lithographed. Supplementary material incorporated chronological in each subject section. Author index in each volume. v. 1, **Temperature.** v. 2, **Moistur** v. 3, **Winds.** v. 4, **Storms. DWB, DLC**—In the section on snow (Vol. 2, p. 298–315) are fou about 300 items about various aspects of snow, snow physics, snow cover, etc. from every countr (Russia, Germany and Japan as well as U. S., England, France, etc.) and arranged chronological from 1555 to 1887. The references are arranged alphabetically by author within each year, and t citations given in the original language except in case of oriental or cyrillic titles. No annotatio are provided but a good author index is appended. The bibliography is the result of internation collaboration and intensive effort at searching, checking, classifying and collating over a period 10 years (under the general guidance of Cleveland Abbe) all of the world's meteorological literatu to 1887. (*See also* 6A–1, January 1955, *MAB.*) *Subject Headings:* **1. Meteorology bibliographie 2. Bibliography on meteorology. I. Fassig, Oliver L.** (*ed.*).—*M.R.*

7G–2 551.578.46:01

†Knoch, K. and Blüthgen, J., **Klimatologie und Meteorologie, 1929–1938, Pt. 1.** [Climatolog and meteorology, 1929–1938, Pt. 1.] *Geographisches Jahrbuch*, Gotha, 58(2):251–478, **1943/194 Pt. 2,** *ibid.*, 59(1):1–217, **1948.** 4191 refs. **DLC**—In this review of progress in meteorology, refe ences to world literature are given in a subject arrangement, with annotations following each entr and each section. The section on snow cover, its properties and distribution (Vol. 59, p. 66–7 contains references to papers on reflective properties, density and geographic distribution of sno cover, effect of snow cover on atmospheric temperature, snow stratification, snow surveying, et (34 selected refs.). A few more references on thermal effects of snow cover will also be found in t section on soil and snow temperature (Vol. 58, p. 388–391). *Subject Heading:* **1. Snow bibliographie** —*G.T.*

7G–3 551.578.4:016 551.525.5:01

†U. S. Snow, Ice and Permafrost Research Establishment, **Annotated bibliography on snow ice and permafrost,** v. 1, Sept. **1951**– Latest issue seen, v. 10, July 1956. Semiannual since 195 This is its *SIPRE Report*, No. 12. **DLC**—The 10 volumes contain 14,000 abstracts of artic dealing with all phases of snow, ice, frost and freezing processes in the earth, on water surfa and in the air, with emphasis on engineering problems in the Arctic. Each volume, consisting 1000 or 1500 abstracts, an author and a subject index, contains numerous references to literatu on the physical (thermal, optical and evaporative) properties of snow cover. In all there are 200 2500 items concerning these and related aspects of snow physics—effects of radiation, temperatur vegetative or forest cover on snow melt or snow accumulation; or the effects of snow cover on a or soil temperatures, etc. In the cumulative subject indexes many items can be found under t major headings of snow, snow cover or glaciers; and under the subheadings of radiation absorptio reflective properties, temperature, thermal effects, density, distribution, evaporation, etc. Man other pertinent items can be found through reference to the individual volume or cumulative auth indexes (Vol. VI), since so much of the work has been done by a few of the most prominent worke (A. Ångström, D. H. Miller, J. E. Church, . . .). This is by far the most complete source references to literature in the field of snow micrometeorology, covering as it does most of the availab literature of the past 100 years in every language and from every country. (*See also* 4.11–13, No 1953; 5I–233, Sept. 1954 and 6A–36, Jan. 1955, *MAB.*) *Subject Headings:* **1. Snow bibliographie 2. Snow physics bibliographies 3. SIPRE bibliography. I. Sherrod, John, Jr.**—*M.R.*

7G–4 551.584:551.78.4

†Geiger, Rudolf, **Das Klima der bodennahen Luftschicht. Ein Lehrbuch der Mikroklimatologi** [The climate near the ground. A textbook of microclimatology.] 3rd ed. rev. and enl. Brunswic Vieweg, **1950.** 460 p. 195 figs., tables, bibliog. p. 408–446. **DWB**—Ch. 16 of this classic micrometeorology (p. 165–178) deals with the lowest atmospheric layer above a snow cover, reviewin the more outstanding works in world literature on reflectivity of a snow surface, heat balance of snow cover, heat absorption by air in the vicinity of a snow surface, radiation absorption by sno penetration of air into a snow cover, structural changes in snow, effect of snow cover on soil tem perature, temperature regime of air above snow during different weather conditions and variou combined microclimatic effects of snow cover, topography and vegetation. (For abstract of Englis trans. of 2nd ed., *see* 2.1–158, Jan. 1951, *MAB.*) *Subject Headings:* **1. Snow cover micrometeorolog 2. Micrometeorological effects of snow cover.**—*G.T.*

7G–5 551.578.46:551.582(794)

*†Miller, David H., **Snow cover and climate in the Sierra Nevada, California.** *California. Univ. University of California Publications in Geography*, v. 11, **1955.** 218 p. 11 figs., 78+5 tables, bibliog. p. 195–213. **DLC**—Review by Rubiato, J. M., in *WMO Bulletin*, 5(1):39–40, Jan. **1956;** Review by Mather, John R., in *Geographical Review*, N. Y., 46(2):288–289, April **1956;** Review by Steinhauser, F., in *Archiv für Meteorologie, Geophysik und Bioklimatologie*, Ser. B, 7(2):297–299, **1956.**—This unusually thorough monograph constitutes one of the few major contributions to the knowledge of snow cover and its relation to microclimate, terrain and vegetation (forests), and is valuable both as a literature survey (covering more than 400 references) and as an orderly integration of the original work of the author and his colleagues in the Central Sierra Snow Laboratory and other research stations in the Sierras, with the work of other authors. The main scientific contribution is the confirmation by a wealth of empirical data and analyses, of the idea long realized in the mountain areas of the West, that the refrigerating influence of a snow cover on climate was not universally true as was assumed by Voeĭkov (1871) and his followers, but that radiational melting, above-freezing temperatures and rapid evaporation of a snow cover, even one of tremendous depth, could take place in the presence of entirely local factors; whereas in the plains region evidence was that a snow cover could disappear only on account of warm air advection, and the snow-covered area even affected nearby snow-free areas. To support this thesis, David Miller takes up the relation between the topography, snow cover, and forests, and the upper air circulation and weather over the Sierras; the role of open forest in local climate, the physics of the snow cover (albedo, long wave radiation and exchange, condensation and evaporation) and finally the total heat economy of the Sierra Crest Region in winter and in spring. (*For a fuller abstract see* 6.10–8, Oct. 1955, *MAB.*) *Subject Headings:* **1. Climate over snow cover 2. Snow cover and atmospheric circulation 3. Albedo of snow 4. Forest microclimatology 5. Bibliography on snow cover influences 6. Snow physics 7. Climate of Sierra Nevadas, California 8. Sierra Nevada, Calif.**—*M.R.*

MAJOR WORKS

7G–6 551.578.46(02)

*†Chirvinskii, P. N., **Sneg i snegozaderzhanie.** [Snow and snow retention.] Rostov-on-Don, Izdat'stvo "Severnyi Kavkaz," **1931.** 239 p. 142 charts and figs., 344 refs. **DLC**—This is a major as well as a pioneer textbook on the physical engineering and climatological aspects of snow (as a mineral) and snow cover (with special reference to conditions in the U.S.S.R.). The extensive Russian (and a small amount of foreign) literature on snow up to **1929** is first reviewed. The geological, climatological, hydrological, agricultural and engineering aspects of snow cover distribution, duration, etc. are considered in the text and illustrated with data, photos and charts. Full-page charts show monthly and annual snow-depth maximum, snow depth and water equivalent of snow for European U.S.S.R. Effects of wind, rain, forests, hills, buildings, etc. on snow retention or drifting are emphasized. Special forms of snow are also given attention. *Subject Headings:* **1. Snow physics 2. Snow cover 3. Snow retention 4. Textbooks 5. U.S.S.R.**—*M.R.*

7G–7 551.551:551.578.46

*Sverdrup, Harald Ulrik, **The eddy conductivity of the air over a smooth snow field. (Results of the Norwegian-Swedish Spitsbergen Exped. in 1934.)** *Geofysiske Publikasjoner*, Oslo, 11(7), **1936.** 69 p. 17 figs., 8 tables, refs., eqs. **DLC**—Observations taken on Isachsen's Plateau on West Spitsbergen, lat. 79°09′N, long. 12°56′E at an altitude of 870 m above sea level are tabulated and used as the basis of a study of the conduction of heat and water vapor in the layer directly above the ground. Both eddy convectivity and eddy conductivity are shown to vary with increasing distance from the boundary surface and to depend on wind velocity, surface roughness and stability of stratification. (*Same item as* 4B–100, Feb. 1953, *MAB.*) *Subject Headings:* **1. Boundary layer 2. Turbulent transfer of heat 3. Evaporation of snow 4. Isachsen's Plateau, West Spitsbergen.**—*M. P. Kramer.*

7G–8 551.521:551.578.46

*†Kalitin, Nikolaĭ Nikolaevich, **Aktinometriia.** [Actinometry.] Leningrad, Gidromet. Izdat., **1938.** 324 p. 161 figs., 147 tables, 141 refs. **DLC**—Ch. XII of this unique text on actinometry and radiation, deals with reflection, absorption and penetration of solar radiation from water, clouds, snow, ice and leafy plants. On p. 280–285 the albedo, penetration and radiation balance of snow cover are treated, with tabular and graphic data presented to illustrate relative magnitude of the several factors during actual situations. The data are based on the author's own observations at Slutsk in 1929–30. Day-to-day changes in albedo from Feb. 15–May 26, 1929 (>84% to <20%) are shown in a graph and explained on the basis of compaction, melting, new snow, etc. Maximum obtained by author was 87% but Chernigovskiĭ obtained a value of 94% in the Arctic. Penetration

of radiation into snow cover was also measured and balance calculated for 3 separate cloudless da (Jan. 26, Feb. 14 and March 19), including incident solar radiation, diffuse radiation, outgoi radiation, albedo (78%, 70% and 70%), balance of snow surface, depth in cm (15, 27 and 52) penetr tion to ground, and remainder in snow (12.27, 39.2 and 97.1 cal.). (*Same item as* 6B–23, Feb. 19 *MAB.*) *Subject Headings:* **1. Solar radiation 2. Albedo of snow 3. Slutsk, U.S.S.R.**—*M.R.*

7G–9 551.578.46(49

Bader, Henri; Haefeli, R.; Bucher, E. et al., **Der Schnee und seine Metamorphose.** [Sn and its metamorphism.] *Beiträge zur Geologie der Schweiz, Geotechnische Serie, Hydrologie,* No. **1939.** 350 p. figs., tables, 18 plates (some fold.). **DLC**—Translation into English issued as U. Snow, Ice and Permafrost Research Establishment, Translation, No. 14, Jan. 1954. 313 p. fig tables, bibliog., p. 302–303.—The original text, published in Switzerland in 1939, was a clas compilation of knowledge of snow mechanics as gained in the laboratory and field. The separ chapters are: I. Mineralogical and structual characterization of snow and its metamorphism, H. Bader; II. Snow mechanics with references to soil mechanics, by R. Haefeli; III. The tin profile, a graphic representation of the development of a snow cover, by R. Haefeli, H. Bader a E. Bucher; IV. Snow investigations in the field, by J. Neher; V. Investigations on conditions density, temperature, and radiation of the Davos snow cover, by O. Eckel and Chr. Tham Introduction by P. Niggli and appendix "Summary of the investigations by the Institute for Sn and Avalanche Research since 1940" by M. de Quervain. It represents the results of years investigations conducted by the Snow and Avalanche Research Commission of Switzerland sin 1931 in the Parsenn-Weissfluhjoch area and at the Davos Meteorological Observatory. (*Same it as* 5.9–2, Sept. 1954, *MAB.*) *Subject Headings:* **1. Snow mechanics 2. Snow surveys 3. Albedo snow 4. Translations 5. Weissfluhjoch, Switzerland 6. Davos, Switzerland 7. Avalanc research. I. Neher, J. II. Eckel, O. III. Thams, Chr. IV. Niggli, Paul V. Van Tienhove Jan C.** (*trans.*).—*M.R.*

7G–10 551.521:551.578.46(988):551.311.

*†Etienne, Erich, **Expeditionsbericht der Grönland-Expedition der Universität Oxford 1938.** [R port of the 1938 Greenland Expedition of Oxford University.] *Leipzig. Universität. Geophy kalisches Institut, Veröffentlichungen,* Ser. 2, 13, **1940.** 227 p. 98 figs., map (fold.), 33 tables, mc than 75 refs. **DWB, DLC**—Radiation measurements made on the previous Oxford Expedition Söndre Strömfjord, Greenland in 1935–1936 are completely analyzed and discussed on p. 65–1 and compared with radiation balance measurements on other Arctic and glacier expeditions. Snc conductivity instruments, measurements and data are treated in Ch. 10 (p. 144–155) and firn te perature measurements in Ch. 11 (p. 156–171). The structure of the firn is considered as a clima indicator on p. 171–177; and meteorological observations on p. 178–183 (Ch. 13). The appen gives tables of radiation, radiation balance (using Albrecht meter), turbidity, firn temperatu glacier movement and other data. An excellent bibliography is appended. Differences betwe clear and cloudy days are clearly indicated by the analysis. *Subject Headings:* **1. Radiation balan over snow 2. Snow temperature measurements 3. Oxford University-Greenland expeditio 4. Söndre Strömfjord, Greenland.**—*M.R.*

7G–11 551.578.

*†Rikhter, Gavriil Dmitrievich, **Snezhnyĭ pokrov, ego formirovanie i svoĭstva.** [Snow cov its formation and properties.] Moscow, Izdat. Akademii Nauk SSSR, **1945.** 120 p. 21 fig 42 tables, 102 refs. **DLC.** Translated by William Mandel as *U. S. Snow, Ice and Permafr Research Establishment, Translation,* No. 6, Aug. **1954.** 66 p. 21 figs., 42 tables, 100 refs. **MH-B** —This compact monograph on the formation and characteristics of snow cover is designed for t use of military engineers of the Red Army. It covers the following aspects: the physics a mechanics of snow cover formations; the density of snow, classification of snow, deposition of sno (drift, accumulation and methods of preventing snow accumulation); the principal physical characte istics and various effects of snow cover; weathering due to snow, etc.; thawing of snow, flow of sno waters and their effects; and the distribution and properties of snow cover in the Soviet Unio Data on the properties of snow and snow cover, maps showing for the U.S.S.R. dates of first a last snow cover, duration and average depth of snow cover are given. A very full bibliography included. (*Same item as* 2–151, Feb. 1950, *MAB.*) *Subject Headings:* **1. Snow cover 2. Sno mechanics 3. Snow physics 4. Snow bibliographies 5. U.S.S.R. I. Mandel, William** (*trans.* —*I.L.D.*

7G–12 551.521:535.243:551.578.

*†Krinov, E. L., **Spektral'naia otrazhatel'naia sposobnost prirodnykh obrazovaniĭ.** [Spectr reflectance properties of natural formations.] Moscow, *Akademiia Nauk,* **1947.** 270 p. 177 fig 15 tables, 45 refs., append. 70 p., tables. **DLC.** Translation by E. Belkov. *National Resear*

Council of Canada, Technical Translation, TT-439, **1953.** 268 p. 27 figs., 15 tables, 45 refs. in text. **DWB**—This book presents the quantitative data obtained from 370 aerial spectrophotometric series (>10,000 separate spectrograms) of various natural ground surfaces in different regions of the U.S.S.R. and in various seasons. The 8 different types of spectrographs used in this work, their calibration against standard surfaces, and the theory are discussed and the equipment illustrated. The data obtained over snow are analyzed on p. 94–95, with indication that reflectivity of the various colors depends greatly on the angle of reflection, and the maximum reflectivity is usually in the shorter wave lengths, whereas most other surfaces have greatest reflectivity in the long wave lengths. Data for 18 runs over snow surfaces are given on p. 184–186, and each run shown graphically from 4000 to 9000 Å on p. 259–262 (charts 131–136). The individual graphs represent data for new snow, normal incidence (83% at 4000 Å down to 57% at 9000 Å), dry snow at 20°, 40°, 60° and 80° elevation angle, and 0°, 90°, 180° and 270° azimuth), snow with an icy crust (elevation angle =45°) on a cloudy day. The translation contains a chart showing areas from which data were obtained (between 1932 and 1942). The figures and tables are faithfully reproduced but the Introduction and Pt. 1 of Ch. 1 are omitted from the translation. (*See also* 3.3–131, March 1952, *MAB.*) *Subject Headings:* **1. Spectral reflectivity 2. Albedo of snow 3. Angular reflectivity 4. Translations 5. U.S.S.R.**—*M.R.*

7G–13 551.578.46:551.311.128

†Bucher, Edwin, **Beiträge zu den theoretischen Grundlagen des Lawinenverbaus.** [Contribution to the theoretical foundation of avalanche defense construction.] Bern, Kümmerly & Frey, **1948.** 113 p. 67 figs., tables, 236 refs., 86 eqs. German, French and English summaries. *Beiträge zur Geologie der Schweiz, Geotechnische Serie, Hydrologie, Lieferung* 6. **DWB.** Translation by Jan C. Van Tienhoven as *U. S. Snow, Ice and Permafrost Research Establishment, Translation,* No. 18, Feb. **1956.** 109 p. 67 figs., tables, 236 refs., 86 eqs. **DLC**—In this elaborate monograph on snow and avalanches, Ch. 2 **Statics and dynamics of the snow cover** takes up the laws of snow metamorphism and the layerwise evolution of a snow cover. This evolution is determined by external conditions. Conditions (temperature, moisture, wind, etc.) at the time of first snowfall are important. Wind packing, hoar frost formations, radiation or warm air firnification of upper layers, etc. are considered also. Examples from winters of 1936/37, 1937/38, 1938/39 . . . 1945/46 are given in elaborate time-section graphs which show the day by day evolution of snow-depth, temperature, density, air-permeability; wind (direction and speed); air temperature, relative humidity, vapor pressure, sunshine, cloudiness, sun and sky radiation, pressure and precipitation from the first snowfall (mid-Sept. to Dec. 1) until the disappearance of the last snow in June or July. Many photographs and much data are included. The measurements were made at the testing field at Weissfluhjoch, Switzerland. (*Same item as* 2.2–124, Feb. 1951, *MAB.*) *Subject Headings:* **1. Snow cover properties 2. Translations 3. Weissfluhjoch, Switzerland.**—*M.R.*

7G–14 551.578.46(02):495.6

Hirata, Tokutaro, **Sekisetsu no Kagaku.** [Science of snow cover.] Tokyo, Chizin Book Co., Ltd., **1948.** 210 p. 53 figs. **DLC**—A unique book on the mechanics of snow cover. Five chapters: 1) Classification of snow cover, 2) Several types of snow cover, 3) Snow melt, 4) Stress produced by snow cover and 5) Avalanches. *Subject Headings:* **1. Snow cover textbooks 2. Textbooks.**—*H. Arakawa.*

7G–15 551.578.46:551.311.12(485)

†*Wallén, Carl Christian, **Glacial-meteorological investigations on the Kårsa glacier in Swedish Lappland, 1942–1948.** *Geografiska Annaler,* Stockholm, 30(3/4):451–672, **1948.** 57 figs., 53–13 tables, 11 eqs., bibliog. p. 665–670. **DLC**—The history of various phases of glacio-meteorological observations is reviewed with ample literature citations going back to the earliest days. The plans for the investigations and details of the expedition are thoroughly outlined and illustrated; the site is described and shown on small and large scale maps. The climate of the area, weather condition in the various years (1941–48), radiation measurements with actinograph, variation of radiation with cloudiness, albedo of snow and ice, outgoing radiation, temperature and humidity, vapor pressure, wind effects, variations at different points in the glacier, variations with height (10, 70, 400 and 600 cm) above glacier, precipitation and fog, deposition, accumulation and ablation for each year, heat balance at glacier surface (analyzed and discussed at great length), comparison with results from other regions of the world, etc. etc. are treated. Appendix gives *in-extenso* the actual observations of incoming radiation and mean cloudiness (every 2 hours for the entire 148 days of the period 1942–48), albedo measurements for summers of 1946–48, temperature, wind, relative humidity at different places and nights, etc. for each day. Highest albedo was 76.6% for frozen snow, lowest 0.9% for wet ice, mean value 60.3%. Causes of ablation and variations in ablation of both snow and ice over the years 1901–1948 are thoroughly analyzed. Detailed calculations of ablation are made for selected periods, many graphs, tables, profiles, etc. are included and a thorough bibliography

of references to 169 works which were cited is appended. *Subject Headings:* **1. Thermal balance snow cover 2. Glacial ablation 3. Albedo of snow 4. Glacier-meteorological expeditio 5. Kårsa Glacier, Swedish Lapland.**—*M.R.*

7G–16 551.579(0

Linsley, Ray K., Jr.; Kohler, Max A. and Paulhus, Joseph L. H., **Applied hydrology.** Ne York, McGraw-Hill, **1949.** 689 p. figs., charts, tables, foot-refs. bibliog. p. 662–663. **DW DLC**—In Chap. 7, "Snow, ice and frost," there is a general discussion of measurement of snow on t ground, water equivalent, quality and structure of snow, geographical variations over U.S.A small scale variations, etc., followed by a section on physics of snow (p. 133–143) wherein the hea transmission, heat exchange between air and snow, conduction from soil, condensation of wat vapor, effect of rainfall, solar radiation, outgoing radiation, albedo, turbulent exchange, etc., a treated from a practical standpoint, with formulas, nomograms, etc., for computing relative an absolute effects of the above factors in the snowmelt. Warning against large errors arising fro theoretical computations is voiced. On p. 159–60 evaporation from snow and ice is discusse based on CROFT (1944). It is shown that evaporation cannot occur unless dewpoint is 32°F. For casting runoff from snow is treated in Chap. 16 and water supply from snow in Chap. 22. Instr ments are discussed in this and other sections, and sources of data, actual computation tables and subject index appended. *Subject Headings:* **1. Snow hydrology 2. Snow physics 3. Hydrolo textbooks.**—*M.R.*

7G–17 551.501.4(08

List, Robert J. (*U.S.W.B., Wash., D. C.*), **Smithsonian meteorological tables.** 6th rev. e Wash., D. C., Smithsonian Institution, **1951.** 527 p. 174 tables, numerous foot-refs., numero eqs. **DLC**—On p. 442–443 (table 154) the albedos of various surfaces obtained by a number authorities in various parts of the world are listed. The values obtained for snow are: 1) fresh snow 81% (Ångström), 87% (Kalitin), 70–86% (Kimball and Hand from the air); 2) old, white, smoo snow—70%; 3) old (lowest value)—46% and 4) ice with sparse snow cover—68%. Values f clouds range from 5% to 84%; grass, 14–37%; forests, 3–25%; ocean, 3–46%; sand, 9–28% a earth, 7–20%. (*See also* 3.1–19, Jan. 1952, *MAB.*) *Subject Heading:* **1. Albedo of snow.**—*M.R.*

7G–18 551.578.4:019.9

†Minnesota. Univ. Institute of Technology, **Review of the properties of snow and ice.** *U. Snow, Ice and Permafrost Research Establishment, SIPRE Report,* No. 4, July **1951.** 156 p. graph tables, refs., eqs. **DWB**—Ch. 5 (p. 52–59) deals with: **Thermal properties;** Ch. 6 (p. 60–72) wit **Radiation properties of snow and ice;** Ch. 7 (p. 73–85) with: **The heat economy of the snow pac** Each chapter has a score or more of references to literature on that particular phase of the subje The illumination over snow and the albedo, absorption, transmission and emission of snow and i are reviewed in Ch. 6, and data of various authors tabulated for spectral and total reflection. Albe is smaller in UV and infrared than in visible portion of spectrum. (*Same item as* 4.5–175, M 1953, *MAB.*) *Subject Headings:* **1. Snow research 2. Ice research 3. Abstracts. I. Mant Homer T.** (*ed.*) **II. Contract W-21-018-eng-676.**—*M.R.*

7G–19 551.578.

†*Nakaya, Ukichiro, **Snow crystals; natural and artificial.** Cambridge, Harvard Univ. Pres **1954.** 510 p. 514 figs., 188 plates, 39 tables, 87+13 refs. **DLC.** English version of origi Japanese text entitled **Yuki no Kankyu** [Studies on snow crystals], pub. Tokyo, Iwanami Book C Ltd., **1949.** 161+17 p. 36 tables, 80 figs., 319 plates (both mostly photos), 36 tables, foot-re In Japanese. **DLC**—Although this outstanding book deals primarily with snow in the atmosphe rather than on the ground, it gives details in Ch. 1 on the effect of sublimation on the structure o snow crystal as it lies on the ground, and is eventually buried. Photomicrographs show such cryst buried at a depth of 5 cm and 30 cm respectively on Mt. Tokachi in Hoddaido, with temperatur well below freezing so that the loss of fine structure and eventual loss of all crystal form would due entirely to sublimation. In Ch. 4, the properties and method of formation of frost on sno surfaces and in snow caves are discussed and illustrated by many photomicrocrystals of such fro formations and caves. (*Same as* 6.1–3, Jan. 1955, *MAB.*) *Subject Headings:* **1. Snow cryst sublimation 2. Frost formation on snow cover 3. Hokkaido, Japan.**—*M.R.*

7G–20 551.506.5:551.311.12(987) 551.5

†*Orvig, Svenn (*Dir. Montreal Off., Arctic Inst. of North America*), **Glacial-meteorological o servations on icecaps in Baffin Island.** *Geografiska Annaler,* Stockholm, 36(3/4):197–318, 195 44 figs. (incl. photos), 14 tables, numerous foot-refs., bibliog. p. 312–318, eqs. **DLC**—A maj monograph presented results of observation on the Baffin ice caps in May–Sept. 1953 by the Seco Baffin Island Expedition. The first Baffin Island Expedition in 1950 measured glacio-meteorologi

nditions at edge of Barnes Ice Cap, and the second expedition on Cumberland Peninsula. The e cap station at 6725 ft was operating May 21 to Aug. 9 with bi-hourly observations from 0800 to 000 h of pressure, temperature, at 3, 13 and 23 ft height, humidity at 3 ft, wind speed at 6 ft, clouds, g, visibility and ceiling. Maximum and minimum temperatures and precipitation at 08, 14 and 0 h, snowfall, rain, and sunshine were also measured. Continuous recordings of pressure, temerature and humidity and incoming short wave radiation were made for 80 days. Spot measureents of net radiative flux and of incoming and outgoing short wave radiation were made occasionally ith special radiometers. Data for May–Aug. 1953 for Padloping Island, 80 mi ENE and for eriod 1944–53 and summary of weather in Cumberland Peninsula during summer of 1953 is followed y description of meteorological observations on Penny Ice Cap, accompanied by samples of recorder ecords, compiled graphs and curves, illustration of equipment, frequency distributions, synoptic harts for North America illustrating frontal passages during summer of 1953. Radiation, sunshine nd albedo are discussed in Ch. 4, ablation in Ch. 5, and heat exchange in Ch. 6. Finally, a comarison is made between ablation factors calculated on 10 expeditions from 1931 and 1953 on different laciers. Radiation, convection and conduction, and condensation factors in ablation show wide ariation in percentages at these places. Of course surfaces vary from snow to ice and elevations rom 5 m to 3000 m, while latitude varies from 46°N to 80°N. An extensive bibliography is apended. (*Same item as* 7.2–24, Feb. 1956, *MAB.*) *Subject Headings:* **1. Baffin Island Expedition, econd, 1953 2. Glacier-meteorological observations 3. Ablation factors 4. Albedo of glaciers . Penny Ice Cap, Baffin Island 6. Padloping Island, Canada.**—*M.R.*

1871

7G–21 551.578.46:551.573 551.578.4:531.311.12

Dufour, Ch. and Forel, F.-A., **Recherches sur la condensation de la vapeur aqueuse de l'air u contact de la glace et sur l'évaporation.** [Study of atmospheric water-vapor condensation on ontact with ice, and of evaporation.] *Société Vaudoise des Sciences Naturelles, Bulletin,* 10(64):621–84, Feb. **1871.** tables, plate. **DLC**—Condensation of atmospheric water vapor on a glacier urface was measured on the Rhone Glacier (1810 m). Results of measurements of atmospheric emperature, saturation temperature and amount of condensation are tabulated for various hours f the day from July 27 to Aug. 1, 1870. If the numerous irregularities resulting from variable ind speed, erratic humidity conditions, unevenness of the glacier surface and instrumental error are isregarded, it may be stated that condensation increases with increasing saturation temperature. he average hourly condensation on glacier surfaces is estimated to be 0.05 mm with a saturation emperature of 1°C; 0.1 mm with 2°C and 0.15 mm with 3°C. Results of measurements made uring evaporation conditions are also tabulated. *Subject Headings:* **1. Condensation on glacier urface 2. Evaporation of snow 3. Rhone Glacier, Switzerland.**—*G.T.*

7G–22 551.578.46:551.582

Voeĭkov, Aleksandr Ivanovich, **On the influence of a covering of snow on climate.** *American ournal of Science and Arts,* New Haven, 102(7):64–66, July **1871. DLC**—The beneficial effects snow cover on crops through insulation of ground against cold, and by delaying the rapid advance vegetation during early spring or until danger from freezes are over, and by providing uniform umidity conditions and a uniform supply of moisture for soil and streams in spring largely offsets he disadvantages due to drifting, spring floods and more intense cold above the snow cover. Effects re also noted with respect to supply of vapor for cyclonic storms and increased maximum and inimum barometric pressure where snow cover is extensive and protected. It also prolongs winter nto spring. *Subject Heading:* **1. Snow cover effects on climate.**—*M.R.*

1885

7G–23 551.578.46:551.582

*Voeĭkov, Aleksandr Ivanovich, **On the influence of accumulations of snow on climate.** *Royal leteorological Society, Quarterly Journal,* 11(56):299–309, Oct. **1885.** 4 tables. **DLC**—Extensive marks, with supporting data, on the effect of a widespread snow cover on the temperature of the round underneath, the air above and even the temperature of ensuing months or of contiguous areas. nsulating effects, radiation from snow cover, effects of colored dust on melting and radiative propties, warm air advection, effect of a cold winter on amount of ice in lakes and bays and hence on pring temperature, the greater effect of deep snow cover on spring than on winter temperatures . places far removed from coasts of seas, the paradox of heavy snows producing little runoff and ght snow cover over frozen soil producing heavy runoff, etc. are discussed. Many unusual winters springs from 1770–1870 are cited and compared for various locations in Russia and Siberia. *ubject Headings:* **1. Snow cover effects on climate 2. U.S.S.R.**—*M.R.*

1892

7G–24 551.525.2:551.578.4

*Abels, Hermann Ferdinand, (sometimes G. Abel's), **Beobachtungen der täglichen Periode de Temperatur im Schnee und Bestimmung des Wärmeleitungsvermögens des Schnees als Functio seiner Dichtigkeit.** [Observations on the daily cycle of snow temperatures and the determinatic of the thermal conductivity of snow as a function of its density.] *Akademiia Nauk SSSR, R pertorium für Meteorologie*, 16(1), **1892.** 53 p. eqs., numerous tables. **DLC, DWB**—Observation were made at Sverdlovsk. This monograph gives *in-extenso* the details of the first systemat series of hourly observations of temperature at the surface of a snow cover and at 5 and 10 cm dept as a function of density and air temperature. Observations were begun on Feb. 4, 1891 and con tinued until March 3, 1891 and were made again from Jan. 1–Feb. 29, 1892. An extensive analys of the data leads to a simple formula for heat conductivity/density. The author obtained a formu

$K = \frac{k}{0.508D}$, where $k = 0.406D^2$, or $K = 0.800D$. Conductivity values ranged from 0.0010 cal/min/c

for density of 0.05 to 0.3289 for $\rho = 0.90$. HJELSTROM (1890) obtained conductivity values of 0.0 cal/min/cm for old (dense) snow. Maximum temperatures occurred earlier at 5 cm in loose sno than in compact snow but at 10 cm no difference was noted. *Subject Headings:* **1. Snow cov temperature variations 2. Thermal conductivity of snow 3. Snow cover density.**—*M.R.*

7G–25 551.578.46:551.57

Miuller, P. A., **K voprosu ob isparenii snezhnogo pokrova.** [Evaporation of snow cover.] Sain Petersburg, **1892.** 53 p. 17 tables, 7 refs. **DLC**—A special study made during 1890–91 at Ekate inburg (Sverdlovsk) Observatory. Hourly observations of snow surface temperature and de point data obtained from psychrometer shelter were used to determine the conditions favorable t evaporation or condensation processes. Condensation was noticed mostly during the nighttim Conditions favorable to evaporation were observed in 73% of all cases. *Subject Headings:* **1. Eva oration of snow 2. Sverdlovsk, U.S.S.R.**—*N.T.Z.*

1901

7G–26 551.578.4

*Jansson, M. and Westman, J., **Quelques recherches sur la couverture de neige.** [A few ob servations of snow cover.] *Uppsala. Universitet. Geologiska Institut, Bulletin*, 5(10):234–26 **1901.** 18 tables. **DLC**—Data on snow cover obtained at Uppsala in Jan.–April 1902 are tabulate The values presented are: snow cover thickness and its variations in conjunction with precipitatic amount of preceding 24 hours, atmospheric temperature and wind speed; snow cover temperatur at noon at various depths and air temperature; specific weight of snow; condensation, evaporatic and melt. *Subject Headings:* **1. Snow cover data 2. Uppsala, Sweden.**—*G.T.*

7G–27 551.578.46:536.2

Jansson, Martin, **Über die Wärmeleitungsfähigkeit des Schnees.** [On the thermal condu tivity of snow.] (*K.*) *Svenska Vetenskapsakademien, Stockholm, Öfversigt af . . . Förhandlinga* 58(3):207–222, **1901.** 3 figs., table, foot-refs. **DLC**—Thermal conductivity of snow slabs wa computed from laboratory measurements made by an improved CHRISTIANSEN (1881) metho Curves show conductivity as a function of density $k = 0.00005 + 0.0019\ d + 0.006\ d^4$. This curve compared with ABELS' (*see* 7G–24) and HJELSTROM's and the differences discussed. *Subject Hea ing:* **1. Thermal conductivity of snow.**—*M.R.*

1904

7G–28 551.578.4

Rozental', R. G., **Plotnost' snega v Irkutske.** [Snow density in Irkutsk.] *Akademiia Nau SSSR, Izvestiia, Ser. 5* (i.e. *Bulletin de l'Academie Imperial des Sciences, Fifth Series*), 20(1):49–5 Jan. **1904.** 6 figs. **DLC**—Results of measurements of snow density made in Irkutsk during 189 1904 are presented. Variations of density depended on size of falling snowflakes, wind, temperatur solar radiation and other factors. Mean density of large snowflakes was about 0.056, increasing u to 0.091 (medium)–.109 (small). Density of fresh snow cover varied between 0.097–0.141. Averag daily increase of snow cover density under gravity influence was about 0.010. Solar radiation al caused density to increase. *Subject Headings:* **1. Snow cover density 2. Irkutsk, Siberia.**—*N.T.*

1905

7G–29 551.578.46:536.

Okada, T., **Thermal conductivity of snow.** *Monthly Weather Review*, Wash., D. C., 33(7):30 **July 1905.** table, ref., eqs. **DWB**—Hourly observation of temperature at 10, 20 and 30 cm dep

in snow exposed to sunshine at Sapporo, Japan (western Hokkaido) were obtained with long-stem mercury thermometers for 13 days from Feb. 5 to Feb. 17, 1904, and are tabulated for each hour of the 24 hours. Density measurements were also made at 5, 25, 34 and 45 cm (increase from 0.13 to 0.35, from 5 to 45 cm), giving a linear equation $\rho = 0.101 + 0.0055x$; where x is a depth in cm. Assuming specific heat of snow to be 0.508 the conductivity from 10 to 20 cm was calculated to be 0.0028, and from 20 to 30 cm 0.00045. Using ABEL's and JANSSEN's formulas, the author gets the following comparative values of conductivity for densities of 0.18 and 0.24:

ρ	Abel's	Janssen's	Okada's
0.18	0.00022	0.00039	0.00028
0.24	0.00039	0.00051	0.00045

Subject Headings: **1. Thermal conductivity of snow 2. Snow temperature data 3. Sapporo, Japan.**—*M.R.*

1907

7G–30 551.578.46

*Okada. T., **Note on the diurnal heat exchange in a layer of snow on the ground.** *Monthly Weather Review*, Wash., D. C., 35(10):450–452, Oct. **1907.** 4 tables, 2 refs. Reprinted from *Meteorological Society of Japan, Journal*, April **1907. DLC**—Observations of temperature every hour at 0, 5, 10, 20 and 30 cm depths from Feb. 16–23, 1907, at the Kamikawa Meteorological Observatory in Hokkaido (43°47′N, 142°22′E, 113 m) are summarized and, using data on the mean density and heat capacity for the several layers of snow (0–5, 5–10, 10–20 and 20–30 cm), the variations in heat content (g cal) in these layers from hour to hour throughout the day are calculated. Total heat exchange in snow on ground was 19 g cal/cm², which is comparable with that for soil of various types. On a cloudy day the average diurnal exchange was 12 g cal and a clear day 24.3 g cal. The flow across the 30 cm level is ignored as it amounts to only 5% of total. *Subject Headings:* **1. Heat exchange in snow 2. Diurnal snow temperature variations 3. Kamikawa Meteorological Observatory, Japan 4. Hokkaido, Japan.**—*M.R.*

7G–31 551.578.46:551.521

Savinov, S., **O taianii snega.** [On snow melting.] *Meteorologicheskiĭ Vestnik*, Leningrad, 17:117–123, 153–162, **1907.** 5 tables. **DWB**—Influence of solar radiation and air temperatures on rate of snow melt was experimentally investigated during the spring of 1905. Albedo of samples of dense snow was about 57–58%. One part of sample was covered by soot. Measurements showed that amount of solar radiation absorbed by snow reached 0.34 cal/min (in pure snow) and 0.83 cal/min in soot covered snow. *Subject Headings:* **1. Radiation properties of snow cover 2. Snow melt 3. Albedo of snow.**—*N.T.Z.*

1908

7G–32 551.578.46:551.579.2

Voeikov, A., **Usloviia ottepeleĭ pro nalichnosti snezhnago pokrova.** [Thawing conditions in the presence of a snow cover.] *Meteorologicheskiĭ Vestnik*, St. Petersburg, 18:37–40, **1908. DWB**—Thawing during a snow cover can only occur as a result of 1) warm winds and 2) solar radiation. When anticyclonic conditions prevail, thawing can not occur (e.g. during the very cold March 1860 and 1898, it was colder in South Siberia than in the North because of light winds in anticyclone over Central and South Siberia). Only warm winds from snow free regions can produce general thawing. *Subject Headings:* **1. Snow cover effects on air temperatures 2. Siberia.**—*M.R.*

1911

7G–33 551.578.46:551.521.63

Kowalski, J. v., **Reflection of ultra-violet rays by snow.** *Nature*, London, 86(2161):144, March 30, **1911. DLC**—The spectrum of a fresh snow cover at an elevation of 630 m in Switzerland was determined for the UV up to 2950 Å, for sunlight reflected at an angle of 45° at 10 h–12 h local time. It was found that the UV rays were almost completely reflected. *Subject Headings:* **1. Ultra-violet reflection from snow 2. Fribourg, Switzerland.**—*M.R.*

1913

7G–34 551.510.42:551.579.2

Jones, Harris A., **Effect of dust on the melting of snow.** *Monthly Weather Review*, Wash., D. C., 41(4):599, April **1913. DWB**—On March 18–19, 1913 a fall of 0.6″ of snow mixed with 1/8″ of dust from New Mexico fell at Wagon Wheel Gap, Colo. The snow continued to fall for several

days but without dust, until it was 9″ deep. The dust increased the rate of melting so that t melting season was advanced about a month from normal, in spite of the fact that mean temperatu were below normal. *Subject Headings:* **1. Dust effects on snow melt 2. Snow melt rate 3. Wag Wheel Gap, Colo.**—*M.R.*

1914

7G–35 551.573:551.578

*Rolf, Bruno, **Note sur la condensation et l'évaporation que se produisent à la surface d'u couche de neige.** [Note on condensation and evaporation which occurs at the surface of a la of snow.] *Arkiv för Matematik, Astronomi och Fysik*, Uppsala, 9(35), **1914.** 19 p. 5 tab foot-refs. **DLC**—During the period from Dec. 18, 1905 to July 25, 1906 at Vassijaure in Swed Lappland, the author made 144 tests at different times of the day of the amount of condensat or evaporation from 4 square snow filled zinc basins of >600 cm² area and 3.3 cm depth, embed in the snow cover so that the snow surfaces were flush. The density of the old and new snow w determined and observations rejected if there was too much melt water or if snow in basins was n representative. In the spring, solar radiation raised the temperature of the snow in the basins ab that in the surrounding snow. Each observation, and the resulting condensation or evaporati is tabulated and summarized by seasons, with meteorological variables (air temperature, wind spe hours of sun, cloudiness, vapor pressure), given and a formula developed for the season. Observ and calculated evaporation or condensation are compared. *Subject Headings:* **1. Evaporation of sn 2. Condensation in snow 3. Vassijaure, Swedish Lappland.**—*M.R.*

1915

7G–36 551.578

*Palmer, Andrew H., **The region of greatest snowfall in the United States.** *Monthly Weath Review*, 43(5):217–221, May **1915.** 13 figs., 4 tables. **DLC**—Snowfall average 420″ a year over 44 year period at Summit, Calif. in Donner Pass, and 521″ at Tamarack (8 years of record). Ma mum annual amounts were 783″ in 1879–80 and 776″ in 1889–1890 at Summit, and 757″ at Tamara in 1910–11. These unbelievable amounts (63–65 ft) have been questioned on the grounds of t exposure (in valleys), but measurements made when 192″ was recorded at Summit showed a variati of only 2″ (190″ to 194″) from average depth at widely separated points which were on level grou Winds are very light in these passes, in contrast to those in the East. Calms occurred 49% of t time in Jan.–April 1915 at Summit. Under trees the ground will be bare when snow is 5 ft de away from the shelter of the trees. Pressure is terrific under such deep snow. Many fine illustratic of deep snows are presented. *Subject Headings:* **1. Snowfall extremes 2. Snow cover variatio 3. Summit, Calif.**—*M.R.*

1916

7G–37 551.508.21 551.521.14:551.578

Abbot, Charles G. and Aldrich, L. B., **The pyranometer: an instrument for measuring s radiation.** *Smithsonian Miscellaneous Collections*, Wash., D. C., 66(7), May **1916.** 9 p. 2 fig 2 tables. **DLC**—The instrument described, based on K. ÅNGSTRÖM's pyrheliometer and pyrg ometer, is used to measure the energy of radiation to or from a complete hemisphere lying above t measuring surface. It was tested by numerous measurements of radiation from the sun, sun and s sky alone, and from newly fallen snow, and gave results very near those obtained with a pyrheliome when corrected to vertical incidence. Albedo of snow for sun and sky radiation combined w found to be 70% (winter of 1915–16). *Subject Headings:* **1. Pyranometers 2. Albedo of new sn 3. Washington, D. C.**—*M.R.*

7G–38 551.578.46:551.5

Henry, Alfred J. (*Wash., D. C.*), **The disappearance of snow in the high Sierra Nevada California.** *Monthly Weather Review*, Wash., D. C., 44(3):150–153, March **1916.** 5 tables, re **DLC**—Snowfall and snow depth observations made from 1907–1915 at Fordyce Dam (6500 Summit (7017′) and Tamarack, Calif. (8,000) in the Sierras, show that snow disappears most rapi at lower elevations in sunny, windy and warm weather and that newly fallen snow goes faster th old compact snow. Years or months with greatest snowfall are months with greatest amount disappearance of snow. Small changes in daytime temperature just below or above freezing ha little effect on rate of ablation. As much as 10 in. of new and 3–4 in. of old snow may disappe each day. Maximum monthly rates are 170–213 in. *Subject Headings:* **1. Snow cover ablati rates 2. Sierra Nevadas, Calif.**—*M.R.*

1919

7G–39 551.578.41

*Ångström, Anders, **On the radiation and temperature of snow and the convection of the air at its surface.** *Arkiv för Matematik Astronomi och Fysik*, 13(21):1–18, **1919.** 4 tables, 18 refs. **DLC**—Observation of snow surface temperatures made during Jan. 1916 at Abisko, Sweden (68°21'N, 18°47'E) are analyzed to show rate of cooling, heat exchange, etc. during the Polar night. The temperature of a snow surface was found to be lower than that of the air when the air temperature is above 0°C, on calm clear nights, and even on many occasions when the air temperature is below 0°C. On cloudy days or nights the sign may be reversed. The conditions governing radiative balance and the equations which are derived for the various factors are set forth and discussed. Diffuse sky radiation under twilight conditions, diurnal temperature variation and moonlight were ignored. Effective radiation was measured with an Ångström pyrgeometer at 2 m elevation, the snow surface temperature with an alcohol thermometer, and temperature at 1.8 cm below and 0.6 m above surface, the humidity and wind speed at 15 m, etc. It was found that the temperature difference between the snow and air at a given height (0.6 m) could be expressed by a linear function of the effective radiation: $\Delta T = 35R$, or $R = 0.03\ \Delta T$, and that convection conveys to the surface 0.03 cal cm^{-2} min at a difference of 1° between surface and 0.6 m height or a convectivity of 0.03 cal/cm^2/sec. In 24 hours with a clear sky and an average temperature difference (5°C), the mean temperature of a 500 m air layer could be reduced more than 14°C. The temperature difference of non-snow covered ground is <1.5 as great. Hence the snow has enormous importance for climate—especially since daytime absorptivity of snow is also low (<30%). Radiation is also related to cloudiness by a linear formula: $R_m = 1\text{–}0.09\ m$; R_m is effective radiation when cloudiness is m and R_0 normal radiation for a clear sky. This formula can be reversed so that cloudiness can be determined e.g. at night from the radiation, though with some qualifications. Considerable data are presented in support of above formulas. *Subject Headings:* **1. Radiation properties of snow 2. Snow temperatures 3. Abisko, Sweden.**—*M.R.*

7G–40 551.578.46:551.524

Blair, Thomas Arthur, **Influences of snow cover on the temperature distribution in Utah, January 1919.** *Monthly Weather Review*, Wash., D. C., 47(3):165–166, March **1919.** fig., table, refs. **DLC**—An anomalous condition prevailed in Utah during Jan. 1919—namely no snow in the northern portion which usually is snow covered, and plenty of snow south of the Uintas in a desert region usually bare of snow in winter. In the northern part the temperature averaged 7°F *above* normal in some places, and in the southeast as much as 18°F *below* normal. A chart shows isanomals of temperature over the entire state. Nocturnal cooling anomaly in the snow covered area was greater than daytime anomaly of maximum temperature, though the latter reached −16.5°F at Green River and −13.2°F at Woodruff which showed the effect of unusual warming over bare ground. A chinook effect may be partially responsible for the positive anomalies, but radiational effects are considered most important as skies were clear on all but 3 days. *Subject Headings:* **1. Snow cover effects on air temperature 2. Utah.**—*M.R.*

1920

7G–41 551.578.46:551.43:551.524

*Köppen, Wladimir, **Die Lufttemperatur an der Schneegrenze.** [Atmospheric temperature near the snow line.] *Petermanns Geographische Mitteilungen*, 66:78–80, March **1920.** table. **DLC**—The local height of the "snow line" depends on temperature, snow depth (precipitation), radiation and evaporation conditions. An analysis is made of height of snow line above sea level throughout the earth, based on records from about 50 stations, over half of which were within 1200 m (elevation) of the snow line. Those at a greater distance (up to 5,000 m) required extrapolation involving considerable chance of error. However variations from the "normal" situation which shows a mean annual temperature of −1° to −5° C and a mean temperature of the warmest months of +2° to −6° C, can be explained on the basis of exposure, latitude and, in extreme cases, to lack of or excess of precipitation. Above certain latitudes the snow line is almost always at sea level. In the Andes it is as low as 4100 m near Quito where heavy precipitation occurs, and at 5850 m (with a mean temperature 10°C lower than at equator in the dry region of Peru. *Subject Headings:* **1. Snow line temperatures 2. Snow line variations 3. Ecuador 4. Peru.**—*M.R.*

1922

7G–42 551.521:551.578.4(494)

*Dorno, C., **Fortschritte in Strahlungsmessungen.** [Progress in radiation measurement.] *Meteorologische Zeitschrift*, 39(10):303–323, Oct. **1922.** fig., 6 tables, refs. **DLC**—In this extensive review of radiation measurements at Davos Nov. 1920–June 1922, the long wave, visible and UV

radiation balance is discussed and tables of data (both illustrative and summarized) are presented. It was found that at high elevations where the ground is covered with snow for 5 months a year only 1/3 of the incoming radiation goes toward warming the air, whereas at sea-level the reverse is true (60% is converted into heat). Albedo of snow was found to increase gradually from 0.72 in the UV to 0.94 in the yellow (based on 5 days records) using a cadmium cell, and from 0.622 to 0.77 using Ångström's pyranometer. Measurements were made over old but frost covered snow. *Subject Headings:* **1. Radiation data 2. Albedo of snow 3. Davos, Switzerland.**—*M.R.*

1924

7G–43 551.578.2:551.52

Schwalbe, G., **Dämpfende Wirkungen des Schnees und Eises auf die Lufttemperatur.** [Moderating effect of snow and ice on air temperature.] *Meteorologische Zeitschrift*, 41(5):142–147, May **1924.** refs. **DLC**—Results of a statistical analysis of winter (Jan.) temperatures are reported. Average temperature values are compared with the most frequent values. Whenever the average is much lower than the frequency peak value, two possible factors may be involved: 1) the statistical effect of a few clear and extremely cold days with a majority of moderate cloudy days and 2) the stabilizing effect of heat (melting+evaporation) absorbed during melting periods. In eastern Germany (Marggrabova) the latter cause prevails while in western Germany cloudiness conditions play the major part. *Subject Headings:* **1. Snow melt effects on temperature 2. Germany.**—*G.T.*

1925

7G–44 551.521.14:551.578.46

*Ångström, Angers, **The albedo of various surfaces of ground.** *Geografiska Annaler*, 7:323–342, **1925.** 6 figs., 9 tables, 8 refs., 6 eqs. **DWB**—With a pyranometer and filters, the albedo of grass, wet and dry ground, trees, sand, snow, and water surfaces were measured. Dry fresh grass had albedo of 0.25 to 0.33 for total sunlight, but 0.45 for red and near infrared, suggesting a value of 0.1 to 0.2 for visible light. Wet grassfields albedo decreases to 0.22; albedo of snow several days old in Alps was .695; albedo of fresh snow in Stockholm was 0.81. Dry sand albedo is 0.18. This drops to 0.09 for wet sand. Decrease is attributed to multiple reflections within thin layers of water. Measurements of water surface from a pier show albedo for diffuse sky light about 0.1. Albedo for direct solar beam follows Fresnel's reflection law closely, although measured values are consistently higher; difference is within limits of probable error in a single measurement. For sun and sky, albedo is 3.9% for solar altitude, h, 47° and increases to 46.5% for $h=5.5°$. Transmission and absorption by leaves is given. *Subject Headings:* **1. Albedo measurements 2. Albedo of ground surfaces 3. Albedo of snow 4. Albedo of water surfaces 5. Sweden.**—*S. Fritz.*

1926

7G–45 551.578.46:551.521.14

*Götz, F. W. Paul, **Strahlungsklima von Arosa.** [Radiation climate of Arosa.] Berlin, Julius Springer, **1926.** 110 p. 31 figs., 69 tables, refs. p. 107–110. **DWB**—On p. 72–83 of this classic on mountain climatology, the available data on illumination from above and from the horizon in different directions and different cloud and snow cover conditions is analyzed for various spectral regions including the UV and for various angles of elevation and for several places (Arosa, Churand Hörnligrat, the latter at 2500 m). The surface illumination or "unterlicht" is then analyzed for Arosa (Dec. 1923–Sept. 1924) showing variations in albedo from 1.00 with fresh snow to 0.31 for almost melted snow (in May). [The high values of albedo may be a matter of definition.] Albedo in blue and UV is also discussed along with measurements of penetration of light into the snow cover. (*Same item as* 5G–5, July 1954, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Snow transparency 3. Daylight illumination 4. Arosa, Switzerland.**—*M.R.*

7G–46 551.578.46:551.593.7

*Kalitin, N. N., **K izucheniiu spektral'noĭ poliarizatsii neba.** [Study of the spectral sky light polarization.] *Zhurnal Geofiziki i Meteorologii*, 3(1/2):61–78, **1926.** 6 figs., 11 tables, refs. English summary p. 77–78. DLC—Extensive measurements made at Slutsk, during 1920–24, of sky light polarization, with and without snow cover, and in 13 regions of the spectrum, using equipment constructed by the author. Results are shown in graphs and tables. Maximum polarization varied from 77 to 80% without snow and from 68 to 72% with snow; mean varied from 65 to 70% without snow and 51 to 56% with snow cover. Lowest values occur at the short end of the spectrum (4500 Å) and highest values at about 6000 Å. *Subject Headings:* **1. Snow cover effects on polarization 2. Spectral polarization measurements 3. Slutsk, U.S.S.R.**—*M.R.*

1927

7G–47 551.578.46:551.52

Loewe, F., **Strahlungs- und Temperaturmessungen an der Lötschenlücke im August 1926.** [Radiation and temperature measurements at the Lötschen gap in August 1926.] *Beiträge zur Physik der Freien Atmosphäre*, 13(3):183–197, Aug. **1927.** tables, refs. **DLC**—Insolation, illumination, sky color, black-bulb temperature, cooling, rock, soil and snow temperature, heat balance of firn, water balance of snow surface and atmospheric humidity were measured in Aug. 1926 in an exposed mountain location some 200 m above the snow line at 3240 m elevation (46½°N, 8°E). Snow temperature was measured at 5, 10, 20 and 40 cm depths. Snow surface temperature falls below freezing when the sun is at a 120° angle. At midnight the snow surface temperature is −6°C and before sunrise −7°C, with a mean air temperature of 0°. Nighttime cooling rapidly decreases with depth. At 5 cm below the surface the lowest temperature is −3 to −4°C, at 20 cm it is only a few tenths of a degree below freezing. At 40 cm there is hardly any diurnal variation. Detailed estimates are made of the heat amounts exchanged between the snow and the atmosphere at different times of the day, and of those used inside the snow cover for the various physical processes leading to firn formation. The study includes data on diurnal variations of vapor pressure in relation to snow temperature (condensation occurs in the morning and evening), and on the relation between snow and air temperature as a function of wind speed. *Subject Headings:* **1. Radiation properties of snow 2. Snow thermodynamics 3. Snow temperatures 4. Lötschen Glacier, Switzerland.**—*G.T.*

1928

7G–48 551.578.46:551.521.63

Hulburt, E. O., **The ultraviolet, visible and infrared reflectivities of snow, sand and other substances.** *Optical Society of America, Journal*, 17:23–25, July **1928. DLC**—The laboratory measurements were made in the spectral region of λ 0.3 to 7μ by thermocouples and a quartz mercury lamp. It was found that the diffuse reflecting power of snow is 2–4 times higher than sand, and contains much more ultraviolet radiation. *Subject Headings:* **1. Ultraviolet reflection from snow 2. Albedo of snow.**—*N.T.Z.*

7G–49 551.521.16:551.578.46

*Lunelund, Harald, **Über die Tageshelligkeit in Finnland.** [On daylight illumination in Finland.] *Finska Vetenskaps-Societeten, Helsinki, Commentationes Physico-Mathematicae*, 4(23), **1928-1929.** 34 p. 7 figs., 26 tables, 13 refs. **DLC**—About 6,000 measurements (4000 at Helsinki) of sky illumination made with a photometer at various places in Finland during 1922–28 are summarized and analyzed to show effects of season, time of day, snow cover, latitude, cloud cover, turbidity, etc. on illumination averages and extremes. The ratio of brightness H to a cloudiness factor S, for snow covered vs. non-snow covered surface at different solar elevations from 5° to 40° is tabulated for Helsinki:

	Brightness at Helsinki in 1000 Lux				
	5°	15°	25°	35°	40°
Surface snow covered	3.23	10.2	18.6	26.3	29.1
Snow free	2.70	8.45	15.6	22.0	25.0
Ratio	1.20	1.20	1.19	1.20	1.16

Relationship of winter to summer values of H/S for various solar angles shows higher values for winter, mostly owing to effect of snow. Values for clear, part cloudy and cloudy skies are also tabulated. *Subject Headings:* **1. Daylight illumination 2. Snow cover effects on illumination 3. Helsinki, Finland.**—*M.R.*

1929

7G–50 551.578.46:551.521.14

*Kalitin, N. N., **Al'bedo zemnoĭ poverkhnosti.** [Albedo of the earth's surface.] *Meteorologicheskiĭ Vestnik*, Leningrad, 39(9/12):224–232, Sept./Dec. **1929.** 3 figs., 6 tables, 3 foot-refs. **DLC**—An Ångström pyranometer (illustrated) was used at Slutsk from Feb. 16 to May 29, 1929, to measure the albedo of snow cover and bare grass after snow melted (on April 23). Five separate measurements of albedo were made in each "series." The maximum occurred on March 11, 1929 at 1346–1350 h (87%). Lower values occurred when the snow was old or packed by wind. Results of several hundred series and averages for each day are tabulated and discussed and a time graph presented to show variations from day to day during the entire period. *Subject Headings:* **1. Albedo of snow 2. Slutsk, U.S.S.R.**—*M.R.*

7G–51 551.578.46

Krömer, W. (*Hamburg*), **Die Erstarrungs- bzw. die Schmelzwärme in dem Temperaturverlauf** [The effect of solidification or melting heat on temperature.] *Annalen der Hydrographie und Maritimen Meteorologie*, 57(2):58–61, Feb. 15, **1929.** fig., tables. **DLC**—Temperature data for Hamburg (winter 1927/28) are graphically analyzed, showing a marked effect of the heat released in the freezing and captured in the thawing processes. It is suggested that reports on snow cover depth be included in daily weather reports of meteorological stations, as the melting of snow will delay the onset of warm weather. To illustrate this, the author analyzes snow cover and temperature data for Marggrabova (1892–1913 and 1919–1923) and Brocken Mountain (1896–1913 and 1919–1923), showing average number of days required to melt snow covers of specified depths. *Subject Headings:* **1. Snow cover effects on climate 2. Snow melt 3. Germany.**—*G.T.*

1930

7G–52 551.578.46:551.521.1

*Kalitin, Nikolaĭ N., **The measurements of the albedo of a snow cover.** *Monthly Weather Review*, Wash., D. C., 58:59–61, **1930.** 2 figs., tables, 2 refs. **DWB**—Values of snow albedo (near Leningrad) varying from 0.87 to 0.46. High values associated with fresh snow, lower values with thawing and older snow. After snow vanished, ground albedo was 0.19 rising to 0.23 as grass appeared. Gives results for wet and dry grass for sunny and overcast conditions. *Subject Headings:* **1. Albedo of snow 2. Albedo measurements 3. Leningrad, U.S.S.R.**—*S. Fritz.*

7G–53 551.578.46:551.521.1

*Kimball, H. H. and Hand, I. F., **Reflectivity of different kinds of surfaces.** *Monthly Weather Review*, Wash., D. C., 58:280–282, **1930.** tables, 3 refs. **DWB**—Photometer measurements from airplane (heights 10 to 4000 ft) over fresh snow show albedo up to 0.89; over smoky Baltimore and over forests 0.10 after snowfall in Feb. Later flights, no snow, fields and forest as low as 0.03. Chesapeake Bay, 0.03; rivers 0.05–0.10. Few green and red measurements. *Subject Headings:* **1. Albedo of snow 2. Baltimore, Md.**—*S. Fritz.*

1931

7G–54 551.501:551.521.1

Ångström, Anders, **Der Einfluss der Bodenoberfläche auf das Lichtklima.** [The influence of earth's surface on the light climate.] *Beiträge zur Geophysik*, Leipzig, 34:123–130, **1931.** 3 refs., 2 eqs. **DWB**—Because of the multiple reflections (of transmitted light) between the ground and the overlying atmosphere, the total downcoming energy J_{rd}, increases as the albedo, r, of the ground increases. The downward inherent reflectivity of the clear atmosphere, d, is taken as 0.25. For $r=0.1$, $J_{rd}=1.025J$, where J is the energy reaching a horizontal ground when $r=0$. When $r=0.7$ as with snow cover, $J_{rd}=1.21J$ for clear skies. For overcast skies, the reflectivity of the cloud base is taken as 0.75; $J_{rd}=1.08J$ for $r=0.1$ and $J_{rd}=2.1J$ for $r=0.7$ under overcast conditions. For ultraviolet light, with clear skies and $r=0.7$, $J_{rd}=1.54J$ because of the greater reflectivity of the overlying atmosphere for shorter wave radiation. The significance of these results for health resorts and vertical windows is discussed. *Subject Headings:* **1. Albedo of snow 2. Albedo of earth 3. Illumination climatology.**—*S. Fritz.*

7G–55 551.521.16:551.578.46

Thomson, Wallace A., **The photo-electric measurement and photographic recording of daylight.** *Canadian Journal of Research*, Ottawa, 4(6):559–564, June **1931.** 7 figs., 6 refs. **DLC**—Daylight illumination intensities were measured with a visitron type 75 A photo-electric cell and Leeds and Northrup d'Arsonval galvanometer with a sensitivity of 0.005 micro-amperes exposed on the roof of a building at the Manitoba Agricultural College, Winnipeg (lat. 49°50′N, long. 97°8′W). Photographic recordings made on several typical days from Feb. 11, 1931 to March 14, **1931** are reproduced to show effects of cloud cover, snowfall, etc. The ground was covered with snow the whole time, but the curves for March 6–12 were typified by lower illumination than occurred on March 14 since the snow cover was modified by mild weather up to March 12, by falling snow on March 12, and the illumination was enhanced on March 14 by the cover of fresh snow. The increased illumination due to broken clouds (20 to 40%) is about equal to that produced by double reflection between snow and cloud after fresh snow. *Subject Headings:* **1. Snow cover effects on illumination 2. Cloud effects on illumination 3. Daylight illumination 4. Winnipeg, Canada.** —*M.R.*

7G–56 551.509.33:551.578.46

Weightman, R. Hanson, **Snow cover in southern Canada as related to temperatures in the North Atlantic States and the Lake Region.** *Monthly Weather Review*, Wash., D. C., 59:383–386;

1931. 14 charts, table. **DWB**—March snow cover over southern Canada is one, but not the main, factor in April temperatures in the northern United States border states. (*Same item as* 2B–111, Feb. 1951, *MAB.*) *Subject Headings:* **1. Long range temperature forecasting 2. Snow cover effects on climate 3. North America.**—*C.E.P.B.*

1932

7G–57 551.578.46:551.524.3

*Hajósy, Ferenc, **Über den Einfluss der Schneedecke auf die Temperatur.** [Effect of snow cover on temperature.] *Meteorologische Zeitschrift*, 49(12):467–470, Dec. **1932.** fig., 5 tables. **DWB**—Data obtained at Lunz Biological Station, Gstettner Alm, Höherstein (1230 m) and other valley, plateau and slope stations in Austria are analyzed to show the influence of a snow cover on the frequency of temperature near freezing (due to freezing and thawing); and on morning, afternoon, and diurnal temperature variations, respectively, especially on clear days. *Subject Headings:* **1. Soil temperatures 2. Temperature variations 3. Austria.**—*M.R.*

7G–58 551.578.46:551.525.2

Levi, F. and Chorus, U., **Wintertemperaturen in und unter der Schneedecke.** [Winter temperature in and under a snow cover.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 113:319, **1932.** **DLC**—General results of temperature measurements obtained at Davos Observatory (1931,32) in snow cover at 0, 30, 60, 90 and 120 cm above and 10 and 30 cm below the ground as well as in snow-free soil at 10 cm are reported. Temperature at the ground surface under snow remained almost steady at $+\frac{1}{2}$°C. At 10 cm below the ground the temperature was around +1°C under snow cover and −4° to −8°C under free surface. Thirty cm above the ground the snow temperature was −2° to −4°C. *Subject Headings:* **1. Snow cover temperatures 2. Soil temperatures 3. Davos, Switzerland.**—*G.T.*

7G–59 551.578.46:551.524.3:551.553.11

Peppler, W., **Seebrisenähnliche Winde bei Schneedecke am Bodensee im März 1931.** [Sea-breeze-like winds with snow cover at Lake Constance in March 1931.] *Zeitschrift für angewandte Meteorologie*, 49(4):117–121, April **1932.** 2 tables. **DLC**—In March 1931 heavy snow fell in southern Germany, creating a deep snow cover at a date when the solar angle is comparatively high. Two remarkable phenomena were observed near Lake Constance on this occasion: a diurnal air temperature variation up to 17° in amplitude and the occurrence of lake breezes. Data on wind conditions at several stations near Lake Constance are tabulated for the days March 13–17, 1931. The remarkable temperature range, involving maximum temperatures up to 8°C over the snow cover, is tentatively attributed to atmospheric absorption of direct and reflected solar radiation, which would require an extremely high absorption coefficient of clear air. *Subject Headings:* **1. Microclimatic effects of snow cover 2. Lake breezes 3. Temperatures over snow surface 4. Lake Constance, Germany.**—*G.T.*

1933

7G–60 551.578.46:551.521

Devaux, Joseph, **L'économie radio-thermique des champs de neige et des glaciers.** [Radiation and thermal balance of snow fields and glaciers.] *Annales de Physique*, Paris, Ser. 10, 20:5–67, July/Aug. **1933.** 10 figs., 9 tables, foot-refs., eqs. **DLC**—Winter snow cover was studied at the Pic du Midi Observatory at 2860 m and summer snow on the glaciers of the Pyrenees, the Alps and Greenland. Temperature conductivity, albedo, light absorption and penetration, etc. were measured with sensitive instruments and photographic records are reproduced. Diurnal variation in snow temperature for different cloud cover conditions, seasonal effects, effects of relief, etc. are discussed. Curves are presented for conductivity of different densities of snow (varies from 14×10^{-5} cal/cm²/sec for density = 0.09 to 230 cal for density = 0.59). Scatter diagram and curve give law for conductivity vs. density. Snow surface temperature varies by as much as 20° to 30°C during 24 hours. Many derived constants or coefficients are given for various parameters. Absorption and penetration curves are also presented for the various glaciers studied. *Subject Headings:* **1. Thermal balance of snow cover 2. Radiation balance of snow cover 3. Pic-du-Midi, France 4. Mont Blanc, France.** —*M.R.*

7G–61 551.521.14:551.583.3

Wandt, W., **Änderungen der Erdalbedo während der Eiszeit.** [Variations in the earth's albedo during the glacial period.] *Meteorologische Zeitschrift*, 50(7):241–250, July **1933.** 4 figs., 30 refs. **DWB**—The secondary effect of increased reflection of solar radiation by snow fields will

enhance whatever primary effect may cause ice ages. The global magnitude of this secondary effect is estimated by dividing hemispheric maps for the ice age and for the present time into light, medium and dark areas and also accounting for cloudiness conditions. It is found that the earth's albedo during the ice age was 3.9% higher in the Northern Hemisphere and 2.3% higher in the Southern Hemisphere than it is now (the Southern Hemisphere has a higher value of cloudiness). This corresponds to an average global temperature decrease of 4°C during the climax of the ice age. This value is in agreement with those obtained by other authors by different methods. It is further estimated that the disappearance of the present permanent snow and ice fields would (due to decrease of albedo) cause a 4.8°C increase of world temperature. *Subject Headings:* **1. Albedo of earth 2. Ice Ages.**—*G.T.*

1934

7G–62 551.578.46:551.521.1

*Bogdanovich, G. P., **Osveshchennost' rasseiannym svetom razlichno orientirovannykh vertikal'nykh poverkhnosteĭ pri bezoblachnom nebe.** [Illumination by scattered light of differently oriented vertical surfaces in cases with clear sky.] *Zhurnal Geofiziki*, Moscow, 4:407–420, 1934. 5 figs., 7 tables, 3 refs. German summary p. 419–420. **DLC**—Illumination measurements made by the Institute of Actinometry and Atmospheric Optics in Slutsk proved that vertical illumination may be twice as high from snow cover as from vegetation cover. Increase of snow cover brightness with sun altitude had more influence on the illumination of vertical surfaces than that on horizontal ones. *Subject Headings:* **1. Albedo of snow 2. Illumination over snow cover 3. Slutsk, U.S.S.R.**—*N.T.Z.*

7G–63 551.578.46(74

Horton, R. E. and Leach, H. A., **Snow-surface temperature.** *Monthly Weather Review*, Wash. D. C., 62:128–130, April **1934.** 2 figs., ref. **DLC**—Determination of temperature of snow surfaces according to observations at Horton Hydrologic Laboratory, Voorheesville, N. Y., is made, and a formula for the computation of mean daily snow surface temperatures is suggested. (*Same item a*-2C–79, March 1951, *MAB.*) *Subject Headings:* **1. Snow surface temperatures 2. Voorheesville, N. Y.**—*N.T.Z.*

7G–64 551.578.46:551.57

*Horton, Robert E., **Water-losses in high latitudes and at high elevations.** *American Geophysical Union, Transactions*, 15(2):351–379, June **1934.** 8 figs., 16 tables, 31 eqs. **DWB**—Data obtained at Wagon Wheel Gap, Colo., are analyzed showing evaporative water losses during season (Nov.–April, inclusive) when ground is snow covered. Relation between evaporation and latitude (30°–45°N) and to altitude (0–6000 ft) at 40°N for western United States and 4000–10,000 ft for Mt. Whitney, Calif. are shown on profile graphs. Evaporation increases to 4000 ft and then decreases to at least 10,000 ft, thereafter remaining constant to >14,000 ft (Mt. Whitney). Theory of evaporation vs. elevation, etc. is carefully worked out. Evaporation from and condensation in snow and ice are discussed at length. *Subject Headings:* **1. Evaporation of snow 2. Evaporation of snow at high altitudes 3. Wagon Wheel Gap, Colo. 4. Mt. Whitney, Calif.**—*M.R.*

7G–65 551.578.46:551.573

Matthes, François E., **Ablation of snow-fields at high altitudes by radiant solar heat.** *American Geophysical Union, Transactions*, 15(2):380–385, June **1934.** 5 figs. **DLC**—The mechanism of the formation of "nieve penitente" (for which the term "sunpits" is suggested) is described. The ideal condition for the (evaporative) formation of sunpits is intense solar heat at below freezing air temperatures and low humidity. On Mt. Rainier, Washington, sunpits occur from the top (>14,000 ft) down to 12,000 ft., suncups down to 10,000 ft and shallow hollows or dimples to 8,000 ft. Little melting occurs above 8,000 ft. *Subject Headings:* **1. Nieve penitente 2. Sunpits 3. Evaporation of snow 4. Mt. Rainier, Wash.**—*G.T., M.R.*

1935

7G–66 551.578.46:551.521.1

*Chudakov, P. A., **Nekotorye dannye po izmereniiu dnevnoĭ osveshchennosti.** [Some results of daily illumination measurements.] *Zhurnal Tekhnicheskoĭ Fiziki*, Moscow, 5:174–175, **1935.** fig., 2 tables. **DLC**—Snow cover is an important factor in illumination. Measurements made during April–Dec. 1933 in Mytishchi (near Moscow) showed that in the presence of snow cover, illumination increased considerably. Mean illumination by direct sunlight in Aug. was 4.3 phot. and in Nov., after establishment of snow cover, increased up to 5.05 phot. Scattered light illumination showed the same relationship. *Subject Headings:* **1. Albedo of snow 2. Illumination over snow cover 3. Mytishchi, U.S.S.R.**—*N.T.Z.*

7G–67 551.578.46:551.521.14

Devaux, Joseph, **Étude de l'albedo de la neige dans le spectre infra-rouge.** [Study of spectral albedo of snow in the infrared.] *Académie des Sciences, Paris, Comptes Rendus,* 200(1):80–81, Jan. 2, **1935.** foot-ref. **DLC**—Observations of the albedo of snow compared with that of a known diffuser (quartz) at Pic du Midi Observatory (2860 m) on April 17, 1934, near noon of a clear day, show the following values:

Wavelength = 0.6μ	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5
Diffusion Factor = 0.67	0.61	0.55	0.34	0.40	0.18	0.21	0.08	0.01

Minima at 1.0 and 1.2μ correspond to absorption bands of H_2O or ice. *Subject Headings:* **1. Albedo of snow in infrared 2. Spectral albedo of snow 3. Pic du Midi, France.**—*M.R.*

7G–68 551.578.46:551.525.2

*Sverdrup, H. U., **The temperature of the firn on Isachsen's Plateau, and general conclusions regarding the temperature of the glaciers on West-Spitzbergen.** *Geografiska Annaler,* Stockholm, 17(1/2):53–88, **1935.** 10 figs., 7 tables, refs., 5 eqs. Also his: **Zum Wärmehaushalt der Gletscher auf West-Spitzbergen.** [The heat balance of glaciers on West Spitsbergen.] *Meteorologische Zeitschrift,* 52:495, Dec. **1935. DLC**—During 8 weeks of the summer of 1934, the author and 3 others (Ahlmann, Olsson and Knudsen) made glaciological observations at a camp on Isachsen's Plateau (lat. 79°09′N, long. 12°56′E, alt. 850 m). Firn temperatures were measured to the greatest possible depth by means of copper-constantan thermocouples inserted in the walls of pits or holes bored in the firn. It was found that the temperature decreased with depth to 3.0 m and then increased until at about 10 m–15 m the temperature was near 0° again. This increase was thought to be due to the penetration of the summer warmth to great depths, and failure of the winter cold to penetrate very deep. Very uneven distribution of temperature was found to exist at the same depths in different places. Ahlmann attributed this to uneven snow structure. Four times daily (9, 6, 12 and 18 h) observation at 1, 1.5, 2, 3, 3.5, 4, 5, 6 and 9 m depth are tabulated for each day from June 30–July 22 at the main station, and at 9 field stations twice a day for a number of days, and every half hour on July 7–9 (2–4 p.m.). Data are also shown graphically, time changes and possible sources of error are discussed, and smoother curves for the various depths, for the main station, and vertical temperature profiles for the field stations (July 9) and the main station (every 5 days, June 25–July 25) are presented. The heat exchange deduced from these curves and similar curves for the freezing period (July 30–Aug. 11) is calculated and discussed in detail. The curves for the freezing in fall as well as for warming up in spring approximate the curves for conduction of heat, since the snow is quite dry. Calculated curves are shown to agree well with observed temperature profiles for any given day. The gradual deepening of the level of minimum temperature from 3 m on June 25 to 6–8 m on July 25 and, finally, an isothermal (at 0°C) condition by Aug. 1, is explained as due, not to penetration of radiation (which cannot be effective below 1 m), or to conduction, but to percolation of melt water which gives up its heat upon re-freezing at greater and greater depths as the firn warms up. Not all of the available energy would be used in warming, nor is it necessary, as 3 times as much is received in the surface layers as would be required for warming from −6.5°C to zero of the limited layer involved. The rest of the energy is carried off by under-firn streams. Snow fields would act similar to firn. *Subject Headings:* **1. Firn temperatures 2. Energy balance of snow cover 3. Isachsen's Plateau, West Spitsbergen.**—*M.R.*

1936

7G–69 551.578.46:551.521.14

Middleton, W. E. Knowles, **Yellow appearance of distant snow fields.** *American Meteorological Society, Bulletin,* 17:365, Dec. **1936. DWB**—Optical and reflective properties of snow cover are analyzed on the basis of observations made by A. Heim (Luft-Farben, Zurich, 1912). Yellowish or bluish colors appeared to be dependent on cloudiness. *Subject Headings:* **1. Optical properties of snow cover 2. Albedo of snow 3. Yellow snow fields 4. Alps.**—*N.T.Z.*

7G–70 551.578.46:551.521.14

*Olsson, Hilding, **Radiation measurements on Isachsen's Plateau.** *Geografiska Annaler,* Stockholm, 18(3/4):225–244, **1936.** 4 figs., 5 tables, 16 refs. **DLC**—Radiation measurements were made by the Norwegian-Swedish Arctic Expeditions during their stay on Isachsen's Plateau (June 26–Aug. 15, 1934). Data on: 1) duration of sunshine, 2) total radiation from sun and sky, 3) albedo of the snow surface and 4) absorption of radiation in snow are tabulated and discussed. Average snow albedo values ranged from 81 to 59 with clear and from 75 to 65 with cloudy sky, for new snow and melted snow surface respectively (detailed values are given). The radiation received at the snow surface is reduced to half its value at 6–8 cm and to 10–20% at 20 cm below the surface. *Subject Headings:* **1. Albedo of snow 2. Snow transparency 3. Radiation in Arctic 4. Isachsen's Plateau, West Spitsbergen.**—*G.T.*

7G–71 551.578.46:551.525

Skriabin, M. I. and A. E. Semenov, **Nochnye minimumy na poverkhnosti pochvy i na poverkhnosti snega.** [Night minimum of temperature on bare soil and snow surface.] *Klimat i Pogoda*, Leningrad, No. 2:30-31, **1936. DLC**—Measurement was made during 41 nights at Voronezh Geophysical Observatory, It was found that in 27 cases the soil surface temperature was higher by 5° than that of snow. The greater differences of temperature were on clear nights, and much less in cloudy weather. *Subject Headings:* **1. Radiation properties of snow 2. Snow-soil temperature difference 3. Voronezh Geophysical Observatory 4. Voronezh, U.S.S.R.**—*N.T.Z.*

7G–72 551.578.46:551.515.8(98)

*Wexler, H., **Cooling in the lower atmosphere and the structure of polar continental air.** *Monthly Weather Review*, 64(4):122–136, April **1936.** 9 figs., 8 tables, 37 refs., 12 eqs. **DLC**—This article comprises a major attempt to account for the modification of Maritime Polar air masses over the Arctic and sub-Arctic continents to produce the extremely cold (in the lower levels) air masses that are known as cP. The aerological soundings made at Fairbanks, Alaska, Ellendale, N. D. and Ås, Norway; the theoretical radiative properties of water vapor, snow and CO_2; the effects of subsidence etc. are analyzed and then synthesized to demonstrate quantitatively the successive steps by which Maritime Polar air is cooled 20 to 40°C in the immediate surface layer, and 10° to 20°C in the higher levels (up to 4 or 5 km). The net radiation balance for each layer of the atmosphere is calculated. Cooling of the air at the snow surface is shown to exceed heat transmission through or from the snow cover. *Subject Headings:* **1. Arctic air mass modification 2. Snow cover effects on air mass 3. Fairbanks, Alaska 4. Ås, Norway.**—*M.R.*

1937

7G–73 551.578.46:551.521.31

*Kalitin, N. N., **Sur les valeurs de la radiation diffuse de l'atmosphère.** [On the values of diffuse radiation in the atmosphere.] *Beiträge zur Geophysik*, Leipzig, 50(2/4):279–284, **1937.** 2 figs., 3 tables, foot-refs. **DLC**—Records of diffuse radiation from cloudy skies in the Arctic reveal unusually high values, in some cases equal to or greater than those for direct solar radiation. The reason given is that the clouds are not usually very dense, and the amount of added diffuse radiation resulting from the very high albedo of a clean, dry snow cover amounts to 20–30% for some kinds of clouds, even on the average, and in some cases even more. A diurnal curve for Cape Schmidt, Siberia for May 31, 1936 (a cloudy day) is almost parallel to the curve for June 4, 1936 (clear sky, direct radiation)—604 cal/cm²/day–600 cal/cm²/day, respectively. *Subject Headings:* **1. Snow cover effects on diffuse radiation 2. Arctic radiation anomalies 3. Diffuse radiation data 4. Cape Schmidt, Siberia.**—*M.R.*

1938

7G–74 551.578.46

*Georgievskiĭ, N. P., **Issledovanie snegovogo pokrova na myse Shmidta v zimovki 1934/35 goda.** [Snow cover investigations during the winter of 1934–35 on Cape Schmidt.] *Problemy Arktiki*, Leningrad, No. 3:71–83, **1938.** 9 figs., 5 tables. **DLC**—Systematic study of physico-mechanical properties of snow cover was continued throughout the winter season. The depth of snow cover equal to 26 cm near the end of Oct. increased to 46–84 cm to the middle of March. During winter snowfalls were in form of ice stars of 1–2 mm. Snow flakes were observed only in July 1935. Modifications of snow cover structure, growth of density and strength of snow cover are shown on tables and graphs, and discussed. The system of air flow around snow drifts, as well as forms of snow drift are also investigated. Distribution of temperatures in snow cover and in soil to the depth of 1.6 m is presented in tables. *Subject Headings:* **1. Snow cover structure 2. Snow cover mechanics 3. Thermal properties of snow 4. Snow cover data 5. Cape Schmidt, Siberia.**—*N.T.Z.*

7G–75 551.521.31:551.578.46

*Kalitin, N. N., **Rasseiannaia radiatsiia atmosfery v Arktike.** [Diffuse radiation of atmosphere in the Arctic.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geograf. i Geofiz.* 2:129–147, **1938.** 13 figs., 14 tables, 3 refs. **DLC**—Diffuse radiation data for Tikhaia (Calm) Bay, Uedineniia Island and Cape Schmidt are presented and discussed. Observations in Slutsk indicate a considerable increase of diffuse radiation by snow cover. Such increase reached up to 65% with the sun near the horizon and 11% with the sun 55° altitude and clear sky. *Subject Headings:* **1. Diffuse-radiation data 2. Snow cover effects on diffuse radiation 3. Arctic 4. Slutsk, U.S.S.R.**

7G–76 551.578.46:551.521.14

*Kalitin, N. N., **Spektral'noe al'bedo snegovogo pokrova.** [Spectral albedo of snow cover.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, No. 2/3:153–163, **1938.** 9 figs., 4 tables,

6 refs. **DLC**—Albedo of new snow is very high (97%) in the UV and infrared, the spectral albedo is 91% and 88%, and when compacted through melting falls to 70% or less, and when the surface becomes granular through further melting, the albedo falls even lower (46%–67%). Actual spectral albedo measurements in 5 regions, and overall albedo recorded on many days in Feb.–April 1937 at Slutsk with a special spectral albedo meter (described, illustrated and spectral characteristics shown graphically) are presented in tables and graphs for various types and amounts of snow cover. With a snow cover of 0.8, the albedo at 5500 Å (green) was 50%, but with 0.2 cover only 26% and with no cover (old dry grass) 17% and green grass 15%. *Subject Headings:* **1. Albedo of snow 2. Spectral albedo of snow 3. U.S.S.R.**—*M.R.*

7G–77 551.311.17(988)

*Moss, R., **Physics of an ice-cap.** *Geographical Journal*, London, 92(3):211–231, Sept. **1938.** 12 figs., table. **DLC**—Data was obtained during the Oxford Univ. Arctic Expedition 1935–36 at the central station on the west ice in North East Land (Sept. 9, 1935–June 11, 1936). Accumulation is from rain (once), frost, snow and drifting snow. Frost accumulation at the northern station 5 mi from the sea was three times that at the central station (Nov.–Feb.). Density, surface temperatures and subsurface temperature data, as well as accumulation and ablation data, are tabulated, discussed and shown graphically. Temperatures were higher and densities lower in the firn than is usually the case (i.e., on Greenland Ice Cap). Snow surface temperatures at noon ranged from −30° to −36°C (Jan.–April), whereas below the surface the coldest was −13°C at one place and −8°, −7° and −6°C at other places (end of April). *Subject Headings:* **1. Physics of ice caps 2. Snow surface temperatures 3. Greenland Ice Cap 4. Oxford Univ.—Greenland expeditions, 5. North East Land, Greenland.**—*M.R.*

7G–78 551.578.4:551.521.14:535.61

Sauberer, Franz, **Versuche über spektrale Messungen der Strahlungseigenschaften von Schnee und Eis mit Photoelementen.** [Spectral measurements, with photoelements, of the radiative properties of snow and ice.] *Meteorologische Zeitschrift*, Brunswick, 55(6):250–255, June **1938.** tables, 10 refs. **DLC**—The author's measurements made at Lunz Biological Station in 1935 and 1936 with Lange selenium photocells and using filters in the range from 360 to 820 mμ were useless as they gave albedo values of >100% due to internal reflection. The measurements made in 1937/1938 gave somewhat better results, indicating very little difference between wave lengths (72% to 76%) in the average. Highest value obtained was 84% for new snow and an overcast sky. These compare with values of 75% to 88% obtained by other authors. The spectral penetrability is also given for the different wave lengths at a depth of 7 cm with a water content of 0.9 cm. Range of values was from 79% at 380 Å to 100% at 5000 Å and 95% at 7600 Å. Absorption coefficient was found to be 0.150, compared with Thams' value of 0.083 obtained with a Graukeil. Values ranged from 0.110 for new snow and 0.290 for old wet snow, and a maximum of 0.320. *Subject Headings:* **1. Albedo of snow 2. Radiation properties of snow 3. Spectral reflectivity.**—*M.R.*

7G–79 551.578.46:551.521.14

*Thams, J. Chr., **Über die Strahlungseigenschaften der Schneedecke.** [The radiative properties of a snow cover.] *Beiträge zur Geophysik, Leipzig*, 53(4):371–388, **1938.** 4 figs. (incl. photos), 7 tables, 17 refs. **DLC**—Albedo measurements were made at Davos on March 4–April 23, 1937. Hourly values were obtained on 37 days which had no snowfall, 12 of which had new snow on the ground. Penetration measurements were made on 40 occasions from March 15–April 9, 1937, with snow varying from 2 to 80 cm depth. Hourly variations are within the limits of instrumental error:

	8 h	9	10	11	12	13	14	15	16
March 26	.83	.84	.81	.84	.84	.80	.84	.82	—
April 14	.61	.61	.60	.58	.61	.62	.63	.61	.63

However the nature of snow cover is much more important:

1937	7 h	8	9	10	11	12	13	14	15	16
April 15 (0.5 cm new snow)	.81	.76	.77	.69	.65	.62	.65	.61	.62	.62
March 16 (7.0 cm new snow)			.85	.86	.85	.83	.83	.83	.83	

Radiation received and absorbed by various layers to 40 cm depth in Jan., Feb., March and April 1937 is calculated and tabulated. Of the incident radiation 13% reaches 10 cm; 2%, 30 cm and 0.6%, 50 cm; and of that which penetrated, 44% reaches 10; 8%, 30 and 2%, 50 cm. *Subject Headings:* **1. Albedo of snow 2. Snow transparency 3. Davos, Switzerland.**—*M.R.*

1939

7G–80 551.578.46:551.521.14

*Berezkin, V. A., **Aktinometricheskie nabliudeniia poliarnykh stantsiĭ.** [Actinometric observations at polar stations.] *Leningrad. Arkticheskiĭ Nauchnoissledovatel'skiĭ Institut, Trudy*, 117(2):5–134, **1939.** 4 figs., 18 tables. **DLC**—Investigations of snow cover albedo were carried out at Cape Schmidt during March–June 1936 and April–July 1937. Albedo of the smooth surface of fresh snow covered by rime reached maximum values and was 90–95%. Albedo of wet melting snow cover was 68–80%. *Subject Headings:* **1. Albedo of snow 2. Cape Schmidt, U.S.S.R.**—*N.T.Z.*

7G–81 551.521.14:551.578.46

*Chernigovskiĭ, N. T., **O radiatsionnykh svoĭstvakh snegovogo pokrova i l'da moreĭ.** [Radiative properties of snow cover and of sea ice.] *Problemy Arktiki*, No. 6:31–38, **1939.** 8 tables, 9 refs. **DLC**—To determine the snow and ice albedo, experiments were made on Uedineniya Island in 1938 by V. I. Sokol'skiĭ; Tiksi Bay in 1937 by N. M. Kopylov; Cape Schmidt in 1936–1937 by M. A. Kuznetzov, and Tikhaia (Calm) Bay (Franz Josef Land) in 1936 by G. V. Biurganovskaia. Mean monthly snow and ice albedo for these are given in tables, which show that the mean monthly snow albedo of the Arctic varies little with latitude during March (87%), April (86–88%) and May (83–84%). Only the southernmost point, Tiksi Bay, shows 80% during May. Snow albedo decreases in June to 70%, in July to 50%. The mean annual variations of ice albedo differ from snow albedo; during spring ice albedo is about 40% in April, 45% in May–June and 50% in July. It increases during Aug. and Sept. to 50–60%. Methods of experimentation are discussed. (*Same item as* 5I–86, Sept. 1954, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Albedo of ice 3. Soviet Arctic.**—*M. W. Snow.*

7G–82 51.578.46:598/9

Formozov, A. N., **Snezhnyĭ pokrov, kak faktor sredy i ego znachenie v ekologii mlekopitaiushchikh i ptits.** [Snow cover as an environmental factor and its importance in the ecology of mammals and birds.] *Moskovskoe Obshchestvo Ispytateleĭ Prirody, Otdel Biologicheskiĭ, Biulletin*, N. S., 48(4):60–69, **1939.** figs., 9 refs. **DLC**—Snow conditions in tundra, taiga, steppe and deserts are described in relation to animal life. Physical properties of snow (heat conductivity, density, icing of the snow surface) were also investigated as an ecological factor for mammals and birds. The importance of snow cover in formation of the quaternary fauna is discussed. *Subject Headings:* **1. Snow cover effects on ecology 2. Animal ecology.**—*N.T.Z.*

7G–83 551.573:551.578.46

Kaitera, Pentti, **The evaporation from snow.** *International Union of Geodesy and Geophysics, Association of Scientific Hydrology, Washington*, 1939, *Comptes Rendus*, V. 2, Commission des Neiges, Question 2, Rapport 2. 10 p. 3 figs., 6 tables, 3 refs. **DWB**—Evaporation measurements made in Helsinki at the Ilmala Observatory in 1937 and 1938 are tabulated and discussed. The measurements were made at several points having different exposures to wind and sun. Evaporation is found to increase with increasing wind and to decrease with rising air temperature. This latter phenomenon is tentatively attributed to the fact that warm weather often favors condensation on the snow surface. (*Same item as* 5–69, May, 1950, *MAB.*) *Subject Headings:* **1. Evaporation of snow 2. Helsinki, Finland.**—*G.T.*

7G–84 551.578.46:551.521

Kalitin, N. N., **Proniknovenie sveta skvoz' sneg.** [Light penetration through the snow.] *Problemy Arktiki*, No. 3:21–28, **1939.** figs., tables. **DLC**—Selenium cells were used for observation in range of wave length between 410–695 mμ. About 50% of light was absorbed in upper 5 cm layer of dry snow, about 30% in the next 5 cm layer, and only about 1.5% penetrated to the 35 cm snow depth. Deeper penetration was observed for infrared light. *Subject Headings:* **1. Radiation properties of snow 2. Snow transparency.**—*N.T.Z.*

7G–85 551.578.46

*Manley, Gordon, **On the occurrence of snow-cover in Great Britain.** *Royal Meteorological Society, Quarterly Journal*, 65(278):2–27, Jan. **1939.** fig., 3 tables, 4 refs. **DLC**—Data for 90 stations, 43 with >20 years of record, have been analyzed to show the relation of frequency of snow cover to other factors such as temperature, depth of snowfall, altitude, etc. Stations varied from 0 to 1840 ft, and from south of England to north of Scotland. *Probable* frequencies of snow cover are given for some of the main highways in Scotland, England and Wales and for stations at heights above 2000 ft, some over 3000 ft. Trends since 1880 are also discussed. Scatter diagram shows curve of number of days with snow on ground vs. monthly mean temperature for 9 upland stations. Formulas are worked out for various geographical regions of the United Kingdom. At 40°F the expectation is for 1.8 days, and at 32° for 24.2 days snow cover. It is stated that the increase in

frequency of *snow cover* is much more rapid (with altitude) than that of *snowfall*, and slight changes in temperature from one year to another make big differences in frequency of snow cover. *Subject Headings:* **1. Snow cover frequencies 2. Great Britain.**—*M.R.*

1940

7G–86 551.578.46:551.588.6

*Atkinson, H. B. and Bay, Clyde E., **Some factors affecting frost-penetration.** *American Geophysical Union, Transactions*, 21(3):935–951, Sept. **1940.** 11 figs., 9 tables, 3 refs. **DLC**—Extensive data are presented in tables and graphs to show correlation between snow depth, vegetal cover, soil moisture, air temperature, soil type, snow density, etc. and depth of frost penetration in ground. Measurements were made at a Soil Conservation Experimental Station near La Crosse, Wisc. in 1936–39. It was concluded that frost depth is less under heavy vegetal cover, under a heavy snow cover, at high atmospheric temperature and on south facing slopes than under the opposite conditions. Frost may actually be drawn from soil under a heavy snow cover. Under a 5″ snow cover there was less frost penetration at −20°F than under a 2″ cover at −8°F. Under 12″ and 24″ snow covers, the temperature of the soil remained unchanged in spite of great air temperature changes. In "Discussion" K. L. ROBERTS states that freezing in New Hampshire was deeper under coniferous forest than under hardwood, because the snow was not so deep (due to evaporation from leaves) in coniferous forest. *Subject Headings:* **1. Snow cover effects on frost penetration 2. Forest influences on snow cover 3. La Crosse, Wis.**—*M.R.*

7G–87 551.578.46

*Ekhart, E., **Zur Kenntnis der Schneeverhältnisse der Ostalpen.** [Knowledge of snow conditions in the Eastern Alps.] *Beiträge zur Geophysik*, Leipzig, 56:321–358, **1940.** 7 figs., 9 maps, 16 tables, 14 refs. **DLC**—Regional distribution of snow cover and its variations were analyzed. Dependence on elevation and meteorological factors was determined by calculation of the mean values of snow depth, etc. for groups of stations. The influence of the aspect of slope on snow cover was also studied. *Subject Headings:* **1. Snow cover distribution with elevation 2. Eastern Alps.** —*N.T.Z.*

7G–88 551.578.46:551.521.1

Kalitin, N. N., **O metodike izucheniia prozrachnosti snega dlia korotkovolnovoĭ solnechnoĭ radiatsii.** [Methodology of study of snow transparency for short wave solar radiation.] *Problemy Arktiki*, No. 4–41–46, **1940.** figs., tables. **DLC**—Instruments and methods used for measuring snow transparency are described. The amount of 322 mμ radiation which penetrated through a 1 cm snow layer reached about 12% and increased with wave length. It was about 20% for radiation of 448 mμ. length. *Subject Headings:* **1. Radiation properties of snow 2. Snow transparency 3. Short wave radiation.**—*N.T.Z.*

7G–89 551.578.46:551.521

*Landsberg, Helmut, **The use of solar energy for the melting of ice.** *American Meteorological Society, Bulletin*, 21(3):102–107, March **1940.** fig., 4 tables. **DLC**—Radiation properties of snow cover are described. Use of coal dust for covering of snow surface in order to increase the intensity of melting is discussed and results of experiment are analyzed. *Subject Headings:* **1. Albedo of snow 2. Radiation properties of snow.**—*N.T.Z.*

7G–90 551.578.46:551.521.14

*Prohaska, F. and Thams, J. Chr., **Neue Untersuchungen über die Strahlungseigenschaften der Schneedecke.** [New investigations on radiative properties of snow cover.] *Helvetica Physica Acta*, Basel, 13:21–44, **1940.** 8 figs., 3 tables, 10 refs. **DLC**—Over 1000 albedo measurements obtained at Weissfluhjoch between Dec. 5, 1938 and April 21, 1939 have been analyzed and statistics presented as to frequencies with below and above freezing temperature: winter (Jan./Feb.) and spring (March/April), daily variations depending on sun's height, etc. Values range from >80% for dry new snow to 50–60% for wet snow. Penetration studies made with a photometer (300–800 mμ) showed that an even greater variation occurs in that parameter between dry new snow and moist snow. Data summarized include 180 observations, 124 at Davos and 56 at Weissfluhjoch. Dry snow gave extinction coefficients of .03 to .25 and moist snow 0.12 to 0.41 (averages 0.13 and 0.28 respectively). Greater variations occurred at Alpine station. *Subject Headings:* **1. Albedo of snow 2. Extinction coefficient of snow 3. Weissfluhjoch, Switzerland 4. Davos, Switzerland.** —*M.R.*

7G–91 551.573:551.578.46:551.588.2

Wentworth, Chester K., **Ablation of snow under the vertical sun in Hawaii.** *American Journal of Science*, 238(2):112–116, Feb. **1940.** 2 figs., refs. **DLC**—Remarkable pitted snow shown in

excellent photos was observed at 13,250 ft near the summit of Mauna Kea, Hawaii in late July 1939. The pits or suncups and spikes which result from sublimation or ablation were as much as 4 ft deep and were exactly vertical and oriented in line with the east-west movement of the vertical sun regardless of slope or wind direction and were produced in not over a week. Some melting may occur as temperature at noon averaged about 52°. Conditions here are compared with those on Mt. Rainier reported by MATTHES (1934). *See* 7G–65. *Subject Headings:* **1. Snow spikes 2. Nieve penitente 3. Evaporation of snow at high altitudes 4. Mauna Kea, Hawaii.**—*M.R.*

1941

7G–92 551.578.46:551.521.1

*Breese, Alexander, **Kalitin on illumination climate.** *American Meteorological Society, Bulletin* 22(2):71–75, Feb. **1941.** 7 tables, 2 foot-refs. **DWB**—A summary of KALITIN's work at Slutsk U.S.S.R. on illumination climatology, giving brief tables showing differences in illumination with and without snow (increase of 10%–220% at sun heights of 50° down to 0°), differences in albedo in various spectral regions for various kinds of surfaces, etc. *Subject Headings:* **1. Snow cover effects on illumination 2. Snow cover effects on albedo 3. Slutsk, U.S.S.R. I. Kalitin, N. N.**—*M.R.*

7G–93 551.573:551.578.4

*Church, James E., **Climate and evaporation in Alpine and Arctic zones.** (In: Michigan. University. Greenland Expeditions, 1926–1933, *Reports*, Vol. 2:7–45, pub. **1941.** 4 figs., 20 tables, foot-refs.) **DLC**—The effects of altitude and latitude on evaporation of snow and ice are clearly illustrated by data obtained at Lake Tahoe (6225 ft) under varying exposures (pine, fir, pine and fir and meadow) and in tree crowns; at Marlette Lake (8000 ft) in June–Sept. 1917; at Mt. Rose, Nev. (9,000–10,800 ft) during 1909–10 and 1913–14; and at several places in Greenland (Camp Michigan, 1926 and Inlandeis, 1928) under differing temperature, wind and humidity conditions. The effect of atmospheric pressure is also shown to be considerable (greater evaporation at high altitudes if temperature and wind are constant). Types of pans used are described and illustrated. Excellent photos show exposures in the several places mentioned. Actual monthly means of all the elements, as well as overall averages and ratios (e.g. water: ice: snow-evaporation), are given in tables and clearly summarized. Evaporation during föhn winds is discussed and striking effects on snow surface in Greenland are illustrated. *Subject Headings:* **1. Evaporation of snow 2. Föhn effects 3. Lake Tahoe, Calif. 4. Marlette Lake, Nev. 5. Mt. Rose, Nev. 6. Greenland.**—*M.R.*

7G–94 551.578.46:551.525

Kreutz, W., **Schutzwirkung der Schneedecke.** [Protective effect of a snow cover.] *Zeitschrift für Angewandte Meteorologie*, 58(10):305–314, Oct. **1941.** 6 figs., table. **DWB**—Protective influence of a 105 cm snow cover was studied at Giessen Jan. 26–Feb. 2, 1941—a period of heavy freezing after mild weather. Minimum air temperature was −14°C, at 5 cm above ground −2.0°C. Course of air and snow temperature at 5, 10, 30, 50, 70, 90 and 105 cm above earth and soil temperature at 10, 20, 50 and 100 cm shown graphically. The same is done for a lower snow cover (20 cm) from Feb. 18–28, 1941. The freezing was much more pronounced at the soil surface when a cold wave passed. Freezing was also deeper under packed snow than under loose. *Subject Headings:* **1. Snow cover influences on soil temperature 2. Giessen, Germany.**—*M.R.*

7G–95 551.579.2:551.501.4

Light, Phillip, **Analysis of high rates of snow-melting.** *American Geophysical Union, Transactions*, 22(1):195–207, July **1941.** 11 figs., 3 refs., 17 eqs. **DLC**—A theoretical melting formula is developed with the use of modern theories of atmospheric turbulence. Nomograms are presented, showing the relationship of snow melt with various factors such as wind velocity, temperature, vapor pressure, turbulent exchange, elevation, etc. Snow melt values computed theoretically are compared with those obtained from hydrograph analysis. *Subject Headings:* **1. Snow melt computation 2. Snow melt nomograms.**—*G.T.*

7G–96 551.578.46

Manley, G., **Observations of snow cover on British Mountains.** *Royal Meteorological Society, Quarterly Journal*, 67:1–4, **1941.** table. **DLC**—Observations of snow cover and frequency of snowfalls were carried out during 1938–1940 at elevations between 1500–3500 ft. No significant differences have been found for length of snow cover period, depending on altitude. *Subject Headings:* **1. Snow cover 2. Snowfall frequencies 3. Great Britain.**—*N.T.Z.*

7G–97 551.578.46:551.593.7

*Neuberger, Hans H., **The influence of the snow cover on the position of Arago's neutral point.** *American Meteorological Society, Bulletin*, 22(9):348–351, Nov. **1941.** fig., 3 tables, 10 refs. **DWB,**

DLC—The average antisolar distance of Arago's point at 10.5° sun elevation is shown to be:

	Blue	White	Red
Without snow cover	22.0°	20.8°	18.8°
With snow cover	21.3°	20.0°	17.9°
Difference	.7	.8	.9

These figures are based on 20 pairs of observations made in the Nittany Valley of Pennsylvania during the winters of 1939, 1940 and 1941. The differences are considered significant, and the causes of the variations with snow cover, due to wave length as well as the differences between snow-covered and non-snow covered ground, are explained. Ageing of snow is also important as it increases the regular reflecting power of the snow, while decreasing the albedo. The optimum age for increasing the difference between snow covered and bare ground is about 1–2 days as shown in table. The solar intensity also influences the difference; at higher intensities the difference is greater. *Subject Headings:* **1. Snow cover effects on polarization 2. Arago's point 3. Nittany Valley, Pa.**—*M.R.*

7G–98 551.579.2:551.501.6

Wilson, W. T., **An outline of the thermodynamics of snow-melt.** *American Geophysical Union, Transactions*, 22(1):182–195, July **1941.** 8 figs., 13 refs., eqs. **DLC**—Rate of snow melting is discussed in detail as a function of heat required, rate of heat transfer through snow, diffusivity of snow, heat available from conduction from air above and soil below, condensation of moisture on cold snow surface, incoming radiation, etc. Nomograms express contributions from warm rainfall, radiation from sun and sky under various amounts of cloud cover, heat-transfer from air by turbulent exchange, latent heat of condensation on snow surface by turbulent exchange and heat loss by outgoing radiation. Effect of elevation, area of snow cover, exposure of snow cover and of meteorological variables associated with these factors are treated separately with actual examples. Temperature of the air is considered to be the most important factor in snow melt. *Subject Headings:* **1. Snow melt thermodynamics 2. Snow melt nomograms.**—*M.R.*

1942

7G–99 551.521.32:551.578.46

Hand, Irving F. and Lundquist, Roy E., **Preliminary study of radiation penetration through snow.** *Central Snow Conference, Michigan State College, Lansing, Dec.* 11–12, 1941, *Proceedings*, pub. **1942**(?). p. 42–44. table, 17 refs. **DWB.** Also their: **Observations of radiation penetration through snow.** *Monthly Weather Review*, Wash., D. C., 70(2):23–35, Feb. **1942.** fig., 2 tables, 19 refs. **DWB**—Data obtained with two Eppley pyrheliometers on May 14–29, 1941 at Brighton, Utah, (29 mi from Salt Lake City at 9000 ft elev. in the Wasatch Mts.) are tabulated and shown graphically. The total snow depth was about 34 in., but slabs varying from ½″ to 10″ thick were tested. Albedos varied from 87% for new snow to 44% and 34% for wet clean and wet dirty snow. Snow density averaged 48% (90% ice grains and 10% water). Density near surface may vary from 5 to 50%. Penetration of radiation varies greatly when slush or melt water accumulates in snow pack or an ice layer forms. Reduction may be as much as 50% in a few minutes. Coloring matter (yellow, red, black green, blue and orange) was placed on surface and relative effects on absorption shown in table. Green absorbed nearly as much as black. *Subject Headings:* **1. Radiation penetration in snow pack 2. Color absorption in snow 3. Brighton, Itah.**—*M.R.*

7G–100 551.578.46:551.524

Landsberg, H.; Cressman, G. P. and Saylor, H. K., **Influence of a snow cover on air temperature.** *Central Snow Conference, Michigan State College, Lansing, Dec.* 11–12, 1941, *Proceedings*, pub. **1942**(?). p. 45–49. 5 figs., 6 refs. **DWB**—Although micrometeorological effects of a snow cover are marked (nocturnal cooling, great daily range in temperature, strong ground inversions, drainage effects), the effect of snow cover on a large moving air mass in lower latitudes is not as great as is usually believed. Even during light winds a gradual warming of the air mass can occur from day to day, as shown by analysis of records made at State College, Penna. on Feb. 10–12, 1941. In South Dakota temperatures in winter were shown to be lower following an extensive snowstorm, but in Kentucky and Tennessee the temperature rose slowly following a storm. *Subject Headings:* **1. Snow cover effects on air temperatures 2. State College, Pa.**—*M.R.*

7G–101 551.579.2:551.584

Slanar, Hans, **Schneeabschmelzung im bewachsenen Gelände.** [Snow melt on terrain covered with vegetation.] *Meteorologische Zeitschrift*, 59:413–416, Dec. **1942.** figs., table. **DLC**—Observations of snow melt progress were made in a park area with varied vegetation and relief from March 11–18, 1935. Daily charts of the receding snow line were analyzed and the effect of various microclimatic conditions discussed. *Subject Headings:* **1. Microclimatic effects of snow melt 2. Vegetation effects on snow melt.**—*N.T.Z.*

7G–102 551.578.46

Wilson, Walter T., **Some observations of the thermal quality of snow.** *American Geophysical Union, Transactions*, 23:553–556, April **1942.** figs. **DLC**—The amount of heat required to melt a sample of snow was determined for 300 samples taken in Utah and Wyoming and was related to certain qualitative characteristics of the snow pack. It has been observed that the wettest snow was usually found near the upper and lower surfaces of the snow pack. *Subject Heading:* **1. Thermal properties of snow.**—*N.T.Z.*

1943

7G–103 551.578.46:551.573(988)

*Georgi, Johannes, **Die bodennahe Luftschicht über dem grönländischen Eis.** [Air layer at the surface over the Greenland ice.] *Deutsches Wissenschaftliches Institut, Copenhagen, Veröffentlichungen, Ser. 1, Arktis*, No. 11, **1943.** 27 p. 12 figs., 4 tables, foot-refs. **DLC**—A monograph describing and illustrating the observation program, instrument exposures and types of instruments at the Inlandeis station of the Alfred Wegener Expedition (Feb. 12–July 30, 1931) during which time an unbroken record of temperature at 2 m and visual observations were obtained. The thermograph traces (at 2 m) in the shelter and at 10 cm for period June 11 to July 15, 1931 are reproduced, and firn temperature measurements at ½ cm and 40 cm depth are presented and analyzed for 5 clear and 5 cloudy days. The portion of the day when evaporation of the firn occurs is shown by shading between the 2 m and the 10 cm height curves (turbulent mixing occurs when the temperature is higher at 10 cm than at 2 m). This is in the forenoon (2h–12h) for clear days and more around midday (6h–16h) on cloudy days. Differences are analyzed and depicted in other ways. Conditions on individual days are analyzed carefully. Actinometer data are also included. *Subject Headings:* **1. Firn temperatures 2. Evaporation of firn 3. Wegener Greenland Expedition, 1929, 1930/31 4. Greenland.**—*M.R.*

7G–104 551.578.4

†*U. S. Weather Bureau and Nevada. University, **Snow studies at the Cooperative Snow Research Project, Soda Springs, California: annual report, 1943/1944 and 1944/1945.** 2 pieces. Photos, tables, graphs, bibliogs. **DWB**—Both reports contain studies on precipitation gage design (anti-freeze and anti-evaporant) and on thermal quality and capillary tension in the ripening snow pack. The data presented include tables on effect of insolation on thermohm and thermocouple readings, effect of ambient temperature on snow pack temperature; comparison of snow and soil temperatures; soil moisture beneath snow pack and precipitation amounts. Various problems like free-water content determination, wind erosion and hoar frost formation, etc. are discussed. *Subject Headings:* **1. Snow research 2. Cooperative Snow Research Project 3. Soda Springs, Calif.**—*G.T.*

1944

7G–105 551.578.4:551.573(792)

Croft, Alfred Russell, **Evaporation from snow.** *American Meteorological Society, Bulletin*, 25:334–337, Oct. **1944.** 2 figs., table. **DWB**—Results presented of preliminary study made from April 28–May 21, 1942 of evaporation from snow under three site conditions on a watershed of the Wasatch Plateau, Utah. Evaporation from snow during the daytime was probably from film of water around the snow crystals—at night purely sublimation. Shading snow surface did not alter evaporation rate; mean daily temperature was also unrelated to evaporation, but air movement and vapor pressure difference between air and snow were highly significant. Condensation occurred when v.p. of air was higher than that of snow. Evaporation from snow was 82% of that for water when insolation and air movement were free, but at shaded sites the evaporation from snow was 112% of that for water. (*Same item as* K–126, Nov. 1950, *MAB.*) *Subject Headings:* **1. Evaporation of snow 2. Wasatch Plateau, Utah.**—*M.R.*

7G–106 551.508.26

Gerdel, R. W., **Snow-temperature studies and apparatus at the Soda Springs, California, Cooperative Snow-Research Project.** *American Geophysical Union, Transactions*, 25(1):118–122, Sept. **1944.** 3 figs., table, 11 refs. DLC—Instruments used in the study of heat transfer into and through snow pack, are described; their applications, limitations and operation are discussed. The instruments are: glass-stem mercurial thermometers, thermohms or electrical-resistance thermometers, thermocouples, and Bouyoucos liquid electrical-resistance thermometer. Both thermohms and thermocouples are found to give satisfactory results at more than 10 in. below the snow surface. With changing atmospheric temperature or with intense solar radiation thermohms are inaccurate at less than 10 in. snow depth. *Subject Headings:* **1. Thermometry 2. Snow temperature instruments 3. Cooperative Snow Research Project 4. Soda Springs, Calif.**—*G.T.*

1945

7G–107 551.578.46:536.2

Kondrat'eva, A. S., **Teploprovodnost' snegovogo pokrova i fizicheskie protsessy v nem pod vliianiem gradienta.** [Thermal conductivity of snow cover and physical processes produced by thermal gradient.] (In: Akademiia Nauk SSSR, **Simpozium, Fiziko-mekhanicheskie svoĭstva snega i ikh primenenie v aerodromnom i dorozhnom stroitel'stve,** p. 14–28, **1945.** figs., 21 refs.) **DLC**—Relationship between the thermal conductivity and density of snow has been determined by laboratory experiments. The method is described and results given as the square of snow density. This ratio was 0.0085 for greater densities and 0.0068 for smaller ones. *Subject Headings:* **1. Thermal conductivity of snow 2. Snow density.**—*N.T.Z.*

1946

7G–108 551.508:551.578.46

Klein, G. J., **Method of measuring the significant characteristics of snow-cover.** *National Research Council of Canada, Report,* No. MM-192, Nov. **1946.** 38 p. 10 figs., forms. Also his: **Snow-cover measurements: supplement to Report No. MM-192.** *Ibid.,* Report No. MM-202, Dec. **1947.** 14 p. 2 figs. **DWB**—Instruments used in snow surveys conducted by the National Research Council of Canada are briefly described with instructions for their use in carrying out the surveys. The elements measured are: air and snow temperature, specific gravity, free water content, grain shape and hardness of snow, and form of snow surface. The instruments, although not novel, have been adapted for easy operation and transportability. General notes on snow properties and nomenclature, and sample report forms are added. *Subject Headings:* **1. Snow surveys 2. Snow instruments.**—*G.T.*

7G–109 551.578.46:912

*Leningrad, Gosudarstvennyĭ Gidrologicheskiĭ Institut. **Atlas maksimal'nykh snegozapasov Evropeĭskoĭ chasti SSSR za period 1892–1944 gg.** [Atlas of the maximum snow reserves in the European part of the U.S.S.R. during 1892–1944.] Leningrad-Moscow, Gidrometizdat., **1946.** 203 p. 193 maps, 4 refs. **DLC**—Data on snow cover obtained at 1090 points in European Russia were used for mapping. The maps give normal distribution of maximum depth and density of snow cover calculated for ten-day period, and also the values of water content in snow cover at time of maximum depth. Analogous data are given also for each year in the period 1892–1944 (for snow cover depth) or 1904–1944 (for density and water content). *Subject Headings:* **1. Snow cover data 2. Snow cover density 3. European U.S.S.R.**—*N.T.Z.*

1947

7G–110 551.578.46:551.510.42 551.579.2

de Quervain, Marcel, **Der Staubfall vom 29. März 1947 und seine Beziehung zum Abbau der Schneedecke.** [The dust fall of March 29, 1947 and its relation to the disappearance of the snow cover.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen,* 127:69–71, **1947.** table. **DLC**—During a föhn on March 29–30, 1947 the Swiss Alps above 1200 m were covered with colored dust which hastened the melting of the snow. Tests were made on a 1 sq m sample, which showed that 3 g of dust per sq m was incorporated in the surface layers of snow. Size distribution, chemical composition, albedo, depth of snow during April, May and June of 1947 compared with previous years, amount of melting due to the increased absorption of radiation, etc. are shown graphically and in tables. The absorption during May would have been 7.4 Kcal/cm² without the dust or 1.9 Kcal/cm² (20%) less than actually occurred. The albedo of the snow was 0.5 in May 1947 and 0.6 in May 1946. The snow cover disappeared $1\frac{1}{4}$ months earlier than normal in 1947.—*Subject Headings:* **1. Dust effects on snow cover 2. Snow melt.**—*M.R.*

1948

7G–111 551.588:551.578.46 551.588.2 551.588.6

Fel'dman, IA. I., **Issledovaniia zavisimosteĭ uslovii mestnoĭ pogody ot glavneĭshikh elementov podstilaiushcheĭ poverkhnosti na ravnine Evropeĭskoĭ territorii Soiuza.** [Investigations of the dependence of local weather conditions on the main elements of the underlying surface in the plain of European U.S.S.R.] *Vsesoiuznyĭ Geograficheskiĭ S"ezd, 2nd, Leningrad, 1948, Trudy,* 2:240–241, **1948. DLC**—Presents results of three investigations. The first, dealing with the influence of snow cover on local weather in spring, showed that the process of local weather formation in a snow covered region and beyond it proceeds differently under conditions of dissimilar air masses. Above the snow cover a cool type of weather prevails with moderate winds and a large temperature range. Outside the snow cover the wind is also moderate, the amplitude is large, but the weather is considerably warmer. (*Same item as* 7.2–258, Feb. 1956, *MAB.*) *Subject Headings:* **1. Snow cover effects 2. Local climates 3. U.S.S.R.**—*A.M.P.*

7G–112 551.578.46:551.521.14

Fritz, Sigmund, **The albedo of the ground and atmosphere.** *American Meteorological Society, Bulletin*, 29(6):303–312, June **1948.** 10 refs. **DLC**—Two pyrheliometers were used for albedo measurement on a flight from Washington, D. C. to Inoykern, Calif. The maximum albedo effect (about 30%) was observed over a surface partially covered by snow. *Subject Headings:* **1. Snow cover 2. Albedo of snow 3. United States.**—*N.T.Z.*

7G–113 551.578.46:551.521.14

Gerdel, R. W., **Penetration of radiation into the snow pack.** *American Geophysical Union, Transactions*, 29(3):366–374, June **1948.** fig., 4 tables, 5 refs., 3 eqs. **DWB**—By means of specially designed pyrheliometer, the transmission of solar energy down through 40 cm of snow was measured. The albedo of snow was measured with Eppley pyrheliometer. High density snow, and ice and slush have low albedo; the lowest albedo measured was 61.3 per cent; the highest albedo was 80.9. The influence of snow density on absorption of radiation and then on run-off is discussed. *Subject Headings:* **1. Albedo of snow 2. Radiation penetration in snow pack 3. California.**—*S. Fritz.*

7G–114 551.521.14:551.578.46

Iaroslavtsev, I. N., **Otrazhennaia radiatsiia ot estestvennykh poverkhnosteĭ v Tashkente.** [Reflection of radiation from natural surfaces in Tashkent.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 12(6):523–530, **1948.** 9 figs., 7 tables, 4 refs. **DLC**—Results of systematic observation on reflection from snow, green and dry vegetation, conducted at Tashkent for 32 months in 1940 and 1944–46 with albedometer of Iu. D. Ianishevskov. Intensity of reflected radiation, albedo of natural cover, and total heat of reflected radiation; calculated albedo varies from 12% for grass to 93% for snow. Monthly total amount of reflected radiation constitutes 15–46% of monthly total heat of radiation. On the average, one fourth of the annual total radiation is reflected from natural cover of the earth. (*Same item as* 1-72, Jan. 1950, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Albedo of natural cover 3. Tashkent, U.S.S.R.**

7G–115 551.578.46

*Kosiba, Aleksander, **Problem zaśnieżenia ziem ślaskich w zależności od warunków hipsometrycznych.** [The problem of snow cover in Silesia as dependent on elevation.] *Przegląd Geograficzny*, Warsaw, 22:157–163, **1948–1949.** 2 tables, 5 refs. **DLC**—Tabulates snow cover data from about 250 stations for 1934–1940. On the average, for Silesia the number of days with snow cover increased at a rate of 11 days per 100 m of elevation, but for the Carpathians this increase was only about 0.6 days. At heights of less than 100 m, the number of days with snow cover averaged 40 days; at a height of 1500 m it was up to 180 days. *Subject Headings:* **1. Snow cover data 2. Snow cover distribution with elevation 3. Silesia, Poland.**—*N.T.Z.*

7G–116 551.311.1:016:8

†Machatschek, Fritz, **Glaziologie.** [Glaciology.] *FIAT Review of German Science*, **1939–1946,** Geography, Pt. I, p. 124–132, pub. **1948.** 17 refs. **DLC**—German glaciological literature of the period 1940–1944 is reviewed in 4 sections (general, glaciers and climate; snow line, glacier balance, ablation; physics and movement of glaciers; glacier fluctuations). The review includes **Gletscherkunde** by E. v. Drygalski and F. Machatschek, a handbook covering the entire field of glaciology (1942). *Subject Headings:* **1. Glaciology 2. Bibliographies 3. German literature.**—*G.T.*

7G–117 551.578.46:551.573

Ostromecki, Jerzy, **Parowanie okresu zimowego.** [Evaporation during winter.] *Przeglad Meteorologiczny i Hydrologiczny*, Torun, No. 1:58–65, April **1948.** 3 figs., 5 tables, 3 refs. English summary p. 4. **DLC**—The observations made with F. Schaffernack's evaporimeter showed that the intensity of evaporation from snow cover might be twice or more as high as that from a water surface. The author's investigations as well as works by B. Poliakov indicate the dependence of evaporation from snow surface upon air temperature and water vapor deficiency. Evaporation was 1–25 mm during the day with temperatures between −20° and −10°C, increasing to 2.5–11 mm with temperatures from −10° to 0°C. A formula for calculating evaporation from a snow surface as a function of water vapor deficiency is suggested. By this formula the mean value of evaporation is equal to 0.43 of mean water vapor deficiency in the air. (*Same item as* 2.5–120, May 1951, *MAB.*) *Subject Heading:* **1. Evaporation of snow.**—*N.T.Z.*

7G–118 551.578.46:551.510.41:546.264

Pichler, Friedrich, **Über den Kohlensäure- und Sauerstoffgehalt der Luft unter einer Schneedecke.** [Content of carbon dioxide and oxygen in air under snow cover.] *Wetter und Leben*, 1:15, April **1948.** **DLC**—Absorptive properties of snow cover were investigated for various ranges of snow cover depth (up to 135 cm). An increase of carbon dioxide under deep cover was noticed.

The oxygen content was the same as that without snow cover. *Subject Heading:* **1. Carbon dioxide absorption by snow.**—*N.T.Z.*

7G–119 551.52:551.578.46

Reuter, Heinz, **Über die Theorie des Wärmehaushaltes einer Schneedecke.** [On the theory of the heat economy of a snow-cover.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 1(1):62–92, **1948.** 5 figs., table, 27 refs., 70 equations. Summary in German, English and French p. 62–65. **MH-BH**—Accepted constants of nocturnal radiation from a loose snow surface give rates of cooling of the surface 7–8 times those observed. Hence there must be considerable upward diffusion of heat by convection in the upper layers. Owing to permeability of snow to short-wave radiation, under steady sunshine, maximum temperature occurs a few cm below surface. Daily and annual periods of solar radiation are then introduced. The formulas for the periodic wave in soil can be applied to the annual wave in snow, but not to the daily wave. (*Same item as* 4–72, April 1950, *MAB.*) *Subject Headings:* **1. Terrestrial radiation 2. Snow cover 3. Thermal balance of snow cover.**—*C.E.P.B.*

7G–120 551.578.46:551.582

*†Rikhter, G. D., **Rol' snezhnogo pokrova v fiziko-geograficheskom protsesse.** [Snow cover importance for physiographical processes.] *Akademiia Nauk SSSR, Institut Geofiziki, Trudy*, 40:5 171, **1948.** 34 figs., 18 tables, refs. **DLC**—Snow cover influence on the climate, the hydrological and geomorphological processes, as well as importance of snow cover for plants and animals are discussed in detail. Special attention is paid to the snow cover distribution over the U.S.S.R. Seven regions with different snow cover conditions are represented. *Subject Headings:* **1. Snow cover data 2. Snow cover distribution 3. Snow cover effects on climate 4. U.S.S.R.**—*N.T.Z.*

7G–121 551.578.46

Shakhov, A. A., **Fizicheskie protsessy v snegovom pokrove.** [Physical processes in snow cover.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog. i Geofiz.*, 12(3):239–248, **1948.** fig., 3 tables, 34 refs. **DLC**—Influence of water vapor migration on the structure of snow cover is analyzed. The migration occurs in upward and downward directions and results in sublimation of vapor on snow crystals and in their freezing together. The process of moisture migration increases the hardness of snow cover. The same effect occurs under wind influence, which destroys the crystalline structure of snow flakes by mixing them together. The growth of hardness of snow cover is caused also by diminishing air temperatures. (*Same item as* 6.9–267, Sept. 1955, *MAB.*) *Subject Headings:* **1. Snow cover 2. Snow mechanics.**—*N.T.Z.*

7G–122 551.575:551.578.46(481)

*Spinnangr, Gunnar, **On fog over snow-covered ground in Finnmarksvidda (North-Norway).** *Meteorologiske Annaler*, 3(1):1–12, **1948.** 3 figs., 3 tables, 4 refs., eq. **DWB**—An analytical study of fog frequency, duration and characteristics, based on data for 1935–1939 at Karasjok, Kontokeino and Karesuando (on a plateau in Northern Norway and Sweden). Frequencies of various temperatures are compared with data for Oslo (1920–1931) and for 10 Siberian lowland stations, as well as later data for northern Norway. Synoptic conditions, relative humidity with respect to ice and to water, change of state at extremely low temperatures, effect of snow cover on duration and dissipation of water and ice fogs, and effect of wind and frontal passages are all considered and conclusions supported by graphs and scatter diagrams. (*Same item as* 10–120, Oct. 1950, *MAB.*) *Subject Headings:* **1. Fog frequencies 2. Fog forecasting 3. Snow cover effects on fog 4. Sweden 5. Norway.**—*M.R.*

7G–123 551.578.46:551.524.4(436)

Steinhauser, F., **Die Schneehöhen in den Ostalpen und die Bedeutung der winterlichen Temperaturinversion.** [Snow depths in the eastern Alps and the importance of the winter temperature inversion.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 1(1):63–74, **1948.** 2 figs., 3 tables, 16 refs. Summary in German, English and French p. 63–64. **MH-BH**—Mean maximum depth of snow increases by ca. 10 cm per 100 m height up to 1,000 or 1,100 m above M.S.L. At this height, except on eastern slopes, there is a sharp decrease of depth, above which increase begins again at an increasing rate. This is associated with a marked winter inversion and decrease of fog at 1,000 to 1,100 m. (*Same item as* 4–117, April, 1950, *MAB.*) *Subject Headings:* **1. Snow cover 2. Temperature inversions 3. Austria.**—*C.E.P.B.*

7G–124 551.578.46

*Work, Robert A., **Snow-layer density changes.** *American Geophysical Union, Transactions*, 29(4):525–545, Aug. **1948.** 18 figs., 10 tables, 9 refs. Abstract p. 525. **Discussion.** Rhodes, Forrest L., p. 545–546. **DWB**—A highly analytical and detailed study of data obtained near

Crater Lake, Oregon (elev. 6,450 ft) during 1940–1941. Tables and curves show lateral and vertical density in relation to time, depth, overburden, current weather, ice layers, etc. Conclusions were: rain falling on light shallow snow passes through, but on deep or fairly dense snow is retained. Snow density is extremely variable and cannot be predicted accurately from samples taken elsewhere. Settling and density increase is continuous but more rapid at first. Melting occurred mostly at the surface, but was not constant per degree-day of temperature above 32°F. Frost penetrates over 24 inches to freeze earth beneath and light penetrates 35 or 40 in. of dense snow to form chlorophyll in new grass. (*Same item as* 4–119, April, 1950, *MAB.*) *Subject Headings:* **1. Snow cover 2. Snow cover density 3. Crater Lake, Oreg.**—*M.R.*

1949

7G–125 551.578.46:536.24

*Bracht, Johannes, **Über die Wärmeleitfähigkeit des Erdbodens und des Schnees und den Wärmeumsatz im Erdboden.** [The thermal conductivity of soil and snow and the thermal exchange in the soil.] *Leipzig. Universität. Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 14(3):147–225, **1949.** 19 figs., 28+15 tables, 36 refs., eqs. **DWB, DLC**—This monograph presents an analysis of detailed experiments on the thermal conductivity of soil, and snow, and the heat exchange between air, snow and soil based on data obtained at Collmberg in 1939–40. Ch. 2 takes up the conductivity of snow. Measurements were made with Albrecht conductivity meter. The parabolic empirical relation derived is: $\lambda = 0.0049\ \rho^2$ compared with WEGENER $= 0.0066\ \rho^2$, ABELS $= 0.00677\ \rho^2$, DEVEAUX $= 0.00007 + 0.007\ \rho^2$ and JANSSON $\lambda = 0.00005 + 0.0019\ \rho + 0.006\ \rho^4$. Values obtained by the author, from LANDOLT-BORNSTEIN, ETIENNE, NIEDERDORFER, and others are plotted to show close relationship to the parabolic curve used. *Subject Headings:* **1. Thermal conductivity of snow 2. Collmberg, Germany.**—*M.R.*

7G–126 551.578.46 551.579

†Church, James E., **Snow and snow surveying: ice.** (In: Meinzer, Oscar E. [*ed.*], **Hydrology.** New York, Dover Publications, **1949.** p. 83–148. 15 figs., tables, 153 refs. *Physics of the Earth*, Vol. 9.) **DLC**—The subject of snow surveying and runoff forecasting is reviewed in its entirety. Internal changes in snow cover due to elevation, wind and season, and the effects of precipitation, evaporation, wind and temperature on runoff are discussed. The bibliography gives a carefully selected sample of literature up to 1940 (the book's first printing was in 1942) on general works, physics of snow and ice, precipitation measurements, snow surveying, factors in forecasting runoff, conservation, floods, avalanches, glacial snow and runoff, ice and icebergs. *Subject Headings:* **1. Snow cover 2. Runoff.**—*G.T.*

7G–127 551.578.46(47)

Fel'dman, IA. I., **O vliianii snezhnogo pokrova na obrazovanie mestnoĭ pogody v usloviiakh russkoĭ ravniny.** [The effect of snow cover on formation of local weather under the climatic conditions of Russian plains.] *Problemy Fizicheskoĭ Geografii*, 14:92–103, **1949.** 5 figs., 2 tables, 7 refs. **DLC**—The effect of snow cover upon weather was investigated by the method of "complex-dynamic-analysis" developed by E. E. FEDOROV and L. A. CHUBUKOV. Orographic influences were eliminated; snow covered areas and bare ground lying under similar air masses at the same time were compared. The types of local weather and their frequency over snow covered and bare ground in the presence of various air masses, the corresponding daily amplitude of temperature and frequency of these amplitudes and daily maxima and minima are discussed and the data are presented in graphs and tables. The conclusions of the study are as follows: the weather over a snow cover and bare ground differs with the prevailing air masses; with cold air masses the weather over a snow cover is mostly cold, cloudless, calm with large diurnal temperature amplitudes; over bare ground it is milder, cloudy, windy, with small temperature amplitudes; with warm air masses the weather over a snow cover is cold, cloudy with small temperature amplitudes; over bare ground it is warmer, with little cloudiness and with large temperature amplitudes; with local air masses the weather over a snow cover and bare ground is characterized by little cloudiness, moderate wind and large temperature amplitudes, but it is colder over a snow cover. (*Same item as* 2.4–148, April 1951, *MAB.*) *Subject Headings:* **1. Snow cover effects on weather 2. U.S.S.R.**—*I.L.D.*

7G–128 551.578.46:551.588.6

Grigor'ev, A. A. and G. D. Rikhter (*eds.*), **Severo-Zapad RSFSR.** [Northwestern RSFSR.] Moscow-Leningrad, **1949.** 226 p. 21 figs., 9 tables, 66 refs. **DLC**—Physiographical conditions in the Novgorod, Pskov, Leningrad, Kalinin, Smolensk and Velikie-Luki provinces are described in detail. On p. 61–68 climatic characteristics are given. Period of snow cover in the area averaged from 98 days in the west to 132 days in the east, with a depth of 50–30 cm. The observations at the Parfino Forest School show forest influence on distribution and melt rate of snow cover. Even

now cover in forest has lower density, and more effectively prevents deep soil freezing. Disappearnce of snow cover in a forest was up to 37 days later than that in a field. *Subject Headings:* **1. Climate 2. Snow cover 3. Forest influences on snow cover 4. European U.S.S.R.**—*N.T.Z.*

7G–129 551.573:551.578.41 551.579.2

Kaitera, Pentti, **Snow melting in the spring and its effects on the opening of the waterways in Finland.** *I.U.G.G. Association of Scientific Hydrology, Oslo 1948,* [*Transactions*], 2:38, [1949]. **DWB**—Brief report on experiments made in 1934–37 to determine rate of melting of snow and vaporation from surface. It was found that on the average 45–50% melts in 5 days, 70% in 10 days, 85% in 15 days, and 95% in 30 days. At −2.9°C, .41 mm evaporated in one day, at +1.5°C, 29 mm, and at +4.3°C, .07 mm. On warmer days the dew point is often higher than the snow temperature resulting in condensation instead of evaporation. (*Same item as* 7.5–197, May 1956, *MAB.*) *Subject Headings:* **1. Snow melt 2. Evaporation of snow 3. Finland.**—*M.R.*

7G–130 551.578.46

†*Kosiba, Aleksander, **Czestosc szaty snieznej na ziemiach Slaskich.** [Frequency of snow cover in Silesia.] *Wroclawskie Towarzystwo Naukove, Prace, Ser. B,* No. 21, **1949.** 92 p. 17 figs., 2 maps, 34 tables, 122 refs. **DLC**—A detailed technical and statistical study of many aspects of snow cover in Silesia—one of the best works of this kind ever published. The general appearance, formation, thermal conductivity, radiation characteristics (solar radiation at surface and at different depths), outgoing radiation, thermal balance of ground and soil moisture under the snow cover; atmospheric turbidity and heat balance in lower levels above the snow cover; snow cover in relation to ecological, bioclimatic and transportation or communication conditions; hydrological factors (snow melt and runoff) and, lastly, the sources and nature of observational data used in this study are discussed. Detailed color charts, analytical and statistical diagrams and tables and an excellent bibliography are included. (*Same item as* 3.11–210, Nov. 1952, *MAB.*) *Subject Headings:* **1. Snow cover 2. Snow characteristics 3. Silesia, Poland.**—*M.R.*

7G–131 551.578.46:551.521.3

Reuter, H., **Zur Theorie des Wärmehaushaltes strahlungsdurchlässiger Medien.** [Contribution to the theory of the heat economy of a media transmitting radiation.] *Tellus,* 1(3):6–14, Aug. **1949.** 4 figs., table, 12 refs. English summary p. 6. **DLC**—Absorption properties of snow cover, ice and water were studied. Mathematical analysis shows that incoming radiation can penetrate these substances, but it is impossible for outgoing radiation to do so. *Subject Heading:* **1. Absorption properties of snow cover.**—*N.T.Z.*

7G–132 551.578.46:551.579.2

Takahashi, Kihei, **Study on shrinking of snow cover.** *Seppyo* (*Snow and Ice*), Tokyo, 11(4): **132–139, 1949.** tables, figs. In Japanese. **DWB**—The author studied the process of shrinking or disappearance of snow cover in spring chiefly due to snow melting. The magnitude of shrinking of snow x increases with the air temperature as well as the solar radiation received as the absorbing surface increases. This magnitude x is naturally proportional to the snow melting, and 92% of the daily shrinking occurs during daytime. *Subject Headings:* **1. Snow cover ablation 2. Snow melt rate.**—*H. Arakawa.*

7G–133 551.578.46:551.573

Wundt, Walter, **Über das Schwinden von Schneeflächen.** [On the disappearance of snow surfaces.] *Wetter und Klima,* 2(5–6):161–167, May–June **1949.** table. **DWB**—From observations on St. Moritz Lake in Jan. 1943, author concludes that at temperatures below 0°C snow surfaces lose ca ½ mm day by evaporation; above 0°C, by melting. Saturation deficit is less important. (*Same item as* 5–81, May 1950, *MAB.*) *Subject Headings:* **1. Snow cover 2. Evaporation of snow 3. Lake St. Moritz, Switzerland.**—*C.E.P.B.*

1950

7G–134 551.578.46

*de Quervain, Marcel R. (*Swiss Snow Res. Inst.*), **Snow and ice problems in Canada and the U.S.A.** *National Research Council of Canada. Div. of Building Research, Technical Report,* No. 5, Feb. **1950.** 70 p. 17 figs., 31 photos, 6 tables. **DWB**—Very thorough study of snow and ice conditions of Canada by a noted Swiss authority. The following problems are discussed in some detail: snow surveying, snow melt and runoff, glaciers, snow drifts, avalanches and avalanche protection, snow removal from highways, streets, airports, railroads and use of heat in snow clearing, snow compaction, snow travel, river and lake ice, icing in the atmosphere, permafrost, snow and ice research in 11 countries, classification of snow literature, and maintaining a bibliography. Many excellent charts and photographs are included. (*Same item as* 3.7–166, July 1952, *MAB.*) *Subject*

Headings: **1. Snow and ice research 2. Canada. I. Pearce, D. C. II. National Research Council of Canada. Div. of Building Research.**—*M.R.*

7G–135 551.578.4:551.521

Gordon, A. R., Jr. and Woodworth, W. C., **Some inter-relationships of snow and ice conditions and weather in the Arctic.** *American Meteorological Society, Bulletin*, 31(8):271–278, Oct. 1950. 8 figs., 10 refs. **MH-BH**—A review of studies made in various sectors of the Arctic, notably by the Norwegians (Sverdrup, Malmgren, Mosby and others) and the Russians. Effect of ice and snow on the radiative balance at the surface and in the lower atmosphere, effect of cloud cover and wind on snow and ice conditions and effect of snow cover on ice discussed. Status of forecasting sea ice reviewed; need for concerted program stressed. (*Same item as* 2.3–134, March 1951, *MAB.*) *Subject Headings:* **1. Snow cover 2. Topographic effects 3. Radiation balance 4. Arctic.**—*M.R.*

7G–136 551.521.32:551.578.46

Hering, W. S. (*Walla Walla, Wash.*), **Evaluation of outward long wave radiation from the snow surface.** U. S. Corps of Engineers, Project CW-171, Technical Bulletin, No. 7, April 24, 1950. 3 p. 2 refs., 4 eqs. **DWB**—Two expressions for outward long wave radiation from a snowpack are presented, one for clear sky (based on BRUNT's formula) and one for cloudy sky (following ÅNGSTRÖM's equation). The former accounts for snow surface temperature and vapor pressure, the latter for vapor pressure, sky cover and height of clouds. Computations were made for the Central Sierra Snow Laboratory. (*Same item as* 5.4–121, April 1954, *MAB.*) *Subject Headings:* **1. Snow pack 2. Snow cover radiation 3. Central Sierra Snow Laboratory.**—*G.T.*

7G–137 551.578.46:551.521.2

*Himmel, James M., **Radiation heat exchange between the snowpack and its environment.** U. S. Corps of Engineers, Project CW-171, Technical Bulletin No. 12, Sept. 1, 1950. 10+p. 6+ figs., 3+tables, 5 refs. **DWB**—Data on net long wave radiation exchange between snowpack and its environment under various conditions of weather and forest cover, as obtained at the Central Sierra Snow Laboratory in 1950, are tabulated, analyzed and graphically represented. Satisfactory agreement is found between observed values and values computed according to the cosine law and the Stefan-Boltzmann law. (*Same item as* 5.3–263, March 1954, *MAB.*) *Subject Headings:* **1. Radiation heat exchange 2. Snow pack 3. Central Sierra Snow Laboratory.**—*G.T.*

7G–138 551.573:551.551:551.579.2

Kohler, Hilding, **On evaporation from snow surfaces.** *Arkiv för Geofysik*, 1(8):159–185, 1950. 8 figs., 5 tables, 8 refs., 35 equations. **DWB**—The theory of turbulent diffusion which controls evaporation from the ground is developed after TAYLOR, SUTTON and others. Curves are derived for determining evaporation as a function of wind and fetch. Observations made by the author from 1918–1925 at Haldde Observatory in northern Norway are tabulated and the turbulence and evaporation compared with theory. Sources of errors listed. Condensation also calculated for different wind directions. (*Same item as* 2.5–119, May 1951, *MAB.*) *Subject Headings:* **1. Evaporation of snow 2. Condensation 3. Norway.**—*M.R.*

7G–139 551.578.46:551.521.14

Miller, David H. (*Cooperative Snow Investigations*), **Albedo of the snow surface as related to weathering factors and stage of the snow.** *U. S. Corps of Engineers and U. S. Weather Bureau, Cooperative Snow Investigations, Research Note*, [No. 1], Dec. 11, 1950. 11+p. 2 figs., tables, 3 refs. **DWB**—Albedo of snow during the winter decreases exponentially from values above 80% just after a snowstorm to 65% after about 400° of accumulated daily maximum temperatures. During the beginning of snow melt the decrease is from 70% to 60% after 400° and to 45% after 1000 accumulated degree days of maximum temperatures. During the heaviest runoff the albedo declines from about 60% to 45% after 400 degree days. Results of measurements and the mathematical analysis are presented in detail. (*Same item as* 2.11–91, Nov. 1951, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Snow melt 3. California. I. Central Sierra Snow Laboratory.**—*A.A.*

7G–140 551.521.14:551.578.46

Miller, David H., **Albedo of the snow surface with reference to its age.** U. S. Corps of Engineers, Project CW-171, Technical Bulletin, No. 6, April 21, 1950. 8 p. table, graphs, refs. **DWB**—Two graphs (one for the accumulation season and one for the melt season) showing albedo as a function of the age of snow surface are presented. They are based on albedo measurements made at the Central Sierra Snow Lab. (1945–1948) and the Upper Columbia Snow Lab. (spring season 1947–48). Albedo values are grouped into six age classes from fresh snow up to snow 8 days old and more. The effects of rain, of surface debris (like pine needles, solid smoke particles), of

sun angle, and of radiation absorption by underlying rock are considered. (*Same item as* 4.5–111, May 1953, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Age of snow 3. Upper Columbia Snow Laboratory.**—*G.T.*

7G–141 551.521.14:551.578.46

Miller, David H., **The depletion method of estimating solar radiation absorbed by the snow.** U. S. Corps of Engineers, Project CW-171, Technical Bulletin, No. 5, April 10, **1950.** 11 p. 3 tables, graph, refs. **DWB**—The method described in this paper is based on computations of W. H. KLEIN reported in *Journal of Meteorology*, 5:119–129, 1948. Values of depletion due to scattering, reflection and absorption by air, dust, water vapor and clouds are deducted from the initial value of solar heat outside the atmosphere, thus providing final values of incoming radiant energy. Through use of methods to estimate albedo of the snow surface by its age and time of day, the value of solar radiation absorbed by the snow pack can be computed. Methods for obtaining the detail values and for computing them are discussed and explained with practical examples from data at the Central Sierra Snow Laboratory and the Upper Columbia Snow Laboratory. (*Same item as* 5.3–169, March 1954, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Absorption by snow pack 3. Snow pack 4. Central Sierra Snow Laboratory 5. Upper Columbia Snow Laboratory.**—*G.T.*

7G–142 551.579.2:551.521.2

Miller, David H., **Insolation and snow melt in the Sierra Nevada.** *American Meteorological Society, Bulletin*, 31(8):295–299, Oct. **1950.** 2 figs., table, 6 refs. **MH-BH**—The influence of weather and solar radiation on snow melt during the spring of 1946 at the Central Sierra Snow Laboratory near Donner Pass, Calif. was studied, and data obtained from 16 stations presented on 6 charts of the area (topography, depth, density, water equivalent, standard error, and ablation as of May 1, 1946). Meteorological variables are also shown graphically for one day (May 5) with high snow melting rate. The thermal budget for this day in cal/sq cm was:

	day	night	total
1. Short wave radiation	+430	0	+430
2. Long wave radiation	−140	−180	−320
3. Convection and condensation	+110	+ 80	+190
4. Carry over day-night	−100	+100	0
5. Melt	−300	0	−300

albedo was 0.40 and incident radiation 718 cal/sq cm. (*Same title as* 2.3–142, March 1953, *MAB.*) *Subject Headings:* **1. Radiation effects on snow melt 2. Snow melt 3. Donner Pass, Calif.**—*M.R.*

7G–143 551.584.34:551.511

Miller, David H., **Micro-meteorological conditions over snow pack in open forest: preliminary report on factors influencing convective heat-exchange.** U. S. Corps of Engineers, Project CW-171, Technical Bulletin No. 11, Aug. 29, **1950.** 17 p. 3 tables, graph. **DWB**—Comparative data are presented on temperature in the lower layer of the atmosphere with and without snow cover. The observations were made at the Central Sierra Snow Lab. between Feb. 1946 and Nov. 1948. Purpose of the study was to determine the effect of snowpack on the amount of convective heat exchange. It was found that during low-sun periods snow cover has no noticeable effect on the intensity of temperature inversions but during the middle of the day 4-ft temperature lapse rate averages 1° over snow cover as opposed to 3° over bare ground. Effects of wind, turbulence, humidity, etc. are discussed. (*Same item as* 4.8-237, Aug. 1953, *MAB.*) *Subject Headings:* **1. Convective heat exchange 2. Snow cover 3. Micrometeorology 4. Central Sierra Snow Laboratory. I. Project CW-171 II. U. S. Corps of Engineers.**—*G.T.*

7G–144 551.578.4:001 551.574:001

Minnesota. University. Institute of Technology. Engineering Experiment Station, **Interim Report to Snow, Ice and Permafrost Research Establishment.** *U. S. Snow, Ice and Permafrost Research Establishment, SIPRE Report*, No. 1, Jan. **1950.** 62 p. chart, tables. **DWB**—The fields of formation, metamorphism, ablation and degradation of snow, ice and frozen ground are divided into detailed research sections. General and military operations dependent on snow and ice conditions are classified. Present-day results of investigations are summed up and 27 future projects recommended. Several appendixes giving terminology, symbols, relation of military end points to recommended projects, etc. are attached. Location of existing research facilities in Canada and United States are shown on a chart. (*Same item as* 4.5–174, May 1953, *MAB.*) *Subject Headings:* **1. Snow research 2. Ice research 3. Definitions 4. Military operations. I. Jordan, Richard C.**—*G.T.*

7G–145 551.596.1:551.578.4

Oura, Hirobumi, **Reflection of sound at snow surface.** *Seppyo* (*Snow and Ice*), Tokyo, 12(3): 273–275, **1950.** table, diagr., eqs. In Japanese. **DWB**—The reflections of sound at the snow surface were observed with the method of standing wave. If the amplitude of incident wave is a and that of reflected wave is b, then the maximum amplitude of standing wave is $a+b$, and the minimum is $a-b$. These values were measured with the carbon microphone and the Brown tube. From these values the rate of absorption $A=(a^2-b^2)/a^2$ was calculated. The results are shown in tables. From these results the following are known: 1) the rate of absorption A is considerably large; 2) the smaller the density, the larger the absorption; 3) for settled snow, the higher the frequency of sound, the larger the absorption; and 4) for settled snow, when the snow was warmed and wetted, the absorption increased. (*Same item as* 6.11–362, Nov. 1955, *MAB.*) *Subject Headings:* **1. Sound absorption 2. Snow cover effects.**—*Author's abstract.*

7G–146 551.578.46:615.831

Polli, Silvio, **Penetrazione delle radiazioni luminose nel ghiaccio e nella neve.** [Penetration of light into ice and snow.] *Annali di Geofisica*, 3(3):371–377, July **1950.** 4 tables, 4 refs. **DWB**—Measurements made at Lake Levico (Trento) on Feb. 20, 1950 at 12–12:30 p.m. with a light ASt cloud cover and 9.0°C air temperature, with a Weston photoelectric cell, showed that the extinction coefficients for snow were 10 times as high as for lake ice and 100 times as high as for lake water. The ratios between the intensity of incident illumination and that of depths of 0, 2, 5, 10, 20, and 50 cm for snow and up to 100 and 200 cm for ice are given in tables and the extinction coefficient calculated for the various colors. For snow there were found to be:

white	violet	blue	green	bright red	dark red
20.7	32.9	31.4	30.4	29.5	29.7

(*Same item as* 2.1–180, Jan. 1951, *MAB.*) *Subject Headings:* **1. Snow transparency 2. Extinction coefficient of snow 3. Lake Levico, Italy.**—*M.R.*

7G–147 551.578.46

Popov, E. G., **O postanovke eksperimental'nykh issledovaniĭ na stokovykh stantsiiakh.** [Planning experiments at runoff stations.] *Meteorologiia i Gidrologiia*, No. 4:18–23, **1950.** table. **DLC**—The importance of several hydrometeorological factors is discussed. Physical properties of snow, its ability to retain the air, as well as the heat exchange in snow are regarded as the most important problems to be investigated. It is stressed that a development of observational methods must precede the experiments. *Subject Heading:* **1. Snow cover observation.**—*N.T.Z.*

7G–148 551.584:551.578.46:63:551.4(02)(47)

*Sapozhnikova, Serafima Afanas'evna, **Mikroklimat i mestnyĭ klimat.** [Microclimate and local climate.] Leningrad, Gidromet. Izdat., **1950.** 239 p. charts, diagrs., tables, graphs, eqs. **MHBH**—Chapt. 11 of this unique text on microclimatology deals with snow cover and its microclimate. Effect of various types and gradients of slopes (hills, valleys, dunes, etc.) on air currents and snow depths, seasonal effects in sheltered and exposed locations, effect of radiation, penetration of light, heat exchange, effect of air temperature on density of snow, effect of varying depth of snow cover on temperature of soil at surface, 0.1, 0.2, 0.4, 0.8 and 1.6 m depth, in different seasons (15 years of record); isotherms in snow and in soil under snow throughout winter (1908–1909); depth of frozen ground depending on height of snow cover and mean monthly air temperature, hourly variations in snow and soil temperature (75 cm down to −20 cm) are treated quantitatively in tables, graphs and text, mostly as a summarization of work of various authors whose names (but not references) are cited. (For abstract on whole text, *see* 3.7–10, July 1952, *MAB.*) *Subject Headings:* **1. Snow cover microclimatology 2. Snow cover effects on soil temperature.**—*M.R.*

7G–149 551.521:551.311.12

Sauberer, F. and Dirmhirn, I., **Die Bedeutung des Strahlungsfaktors für den Gletscherhaushalt.** [The importance of the radiation factor in the economy of glaciers.] *Wetter und Leben*, 2(11–12): 248–261, June **1950.** 3 figs., 11 tables, 14 refs. **DWB**—Authors calculate incoming radiation (sun, sky, long wave), outgoing (reflection, long wave) and radiation balance for each month at 3000 meters in the Alps. The most variable factor is the reflection from snow surface; albedo varies from 0.8 with new snow to below 0.2 (old dirty ice). Frequent light snowfalls therefore cause negative radiation balance. (*Same item as* 9–76, Sept. 1950, *MAB.*) *Subject Headings:* **1. Radiation 2. Albedo of snow 3. Glaciers 4. Alps.**—*C.E.P.B.*

7G–150 621.396:551.588.5

Saxton, J. A., **Reflection coefficient of snow and ice at V.H.F.** *Wireless Engineer*, 27(316): 17–25, Jan. **1950.** 13 figs., table, 10 refs., 22 eqs., 2 append. **DLC**—Discussion of the nature and

omposition of snow, the dielectric properties of snow, land and sea at 30, 300, 3,000 and 30,000 Mc/s, nd the effects of multiple reflection phenomena in changing the vertical-coverage diagram of a very igh frequency radio transmitter. Reflection coefficients for plane waves under the above conditions re given in equations, tables and nomograms. (*Same item as* 7–99, July 1950, *MAB.*) *Subject leadings:* **1. Radio reflection from snow cover 2. Dielectric properties of snow.**—*M.R.*

7G–151 551.579.2:551.501:551.506

*U. S. Corps of Engineers, **Criteria for estimating runoff from snow melt.** Project CW-171, echnical Bulletins, Nos. 4, 8–10, April 10, May 26, Sept. 5, **1950.** 4 pieces. tables, graphs. **DWB**—In Bulletin No. 4, D. W. HULLINHORST presents comparative data on observed hourly lischarges of Castle Creek, Central Sierra Snow Laboratory, for April 1947 and two-hourly estimated lischarges. The discharge estimates are based on expected amounts of snow melt in the basin, omputed from available values of temperature, wind, humidity, sunshine and cloudiness, and ccounting for long- and short-wave radiation and convective exchange. Good agreement is found etween estimated and measured runoff. Bulletin No. 8, by D. W. HULLINGHORST and D. H. MILLER, presents a more detailed description of the method used in computing the hourly values of emp., wind speed, radiation, vapor pressure, cloudiness, etc. from which hourly values of estimated now melt and finally of runoff were obtained. Samples of data are presented and explained. Bulletin No. 9 supplements some values given in Bulletin No. 8. In Bulletin 10, by R. M. HAMILTON, he relationships obtained for 1947 (Bulletins 4, 8, 9) are applied to data available for 1946 (with roughly 50% more snow). Actual and estimated hydrographs for April 1946 are compared in the same way as in Bulletin 4. (*Same item as* 4.5–178, May 1953, *MAB.*) *Subject Headings:* **1. Snow-melt 2. Runoff. I. Hullinghorst, D. W. II. Miller, D. H. III. Hamilton, R. M.**—*G.T*

7G–152 551.574.1:551.573:551.578.46

Yosida, Zyungo, **Heat transfer by water vapor in a snow cover.** *Low Temperature Science,* Sapporo, Japan, 5:93–100, **1950.** 4 figs., eqs., 3 refs. In Japanese; English summary p. 100. **DWB**—In the presence of a temperature gradient in a snow cover, water vapor evaporates from an ice particle, diffuses in direction of decreasing temperature and condenses on opposite surface of next particle. The existence of such a transfer of water vapor was confirmed by microscopic observation of the deformation of snow particles. The diffusion coefficient of water vapor in snow was also determined experimentally. The heat conveyed by diffusion of water vapor was found to be

$$2.2 \times 10^{-4} \frac{dt}{dx} \text{ cal/cm. sec°C,}$$

where dt/dx is the temperature gradient. (*Same item as* 6.2–248, Feb. 1955, *MAB.*) *Subject Headings:* **1. Thermal balance of snow cover 2. Condensation of water vapor 3. Water vapor heat transfer 4. Snow cover.**—*M.R.*

1951

7G–153 551.578.46

*Bader, Henri; Hansen, Bernard Lyle; Joseph, Jerome A. and Sandgren, Marvin A., **Preliminary investigations of some physical properties of snow.** Minnesota. University. Institute of Technology. Engineering Experiment Station, Contract DA-21-018-ENG-200 and Contract DA-21-018-ENG-221, Final Report, June **1951.** 48 p. 46 figs., diagrs. (fold.), refs., eqs. *U. S. Snow, Ice and Permafrost Research Establishment, SIPRE Report,* No. 7, June **1951.** **DWB**—A valuable, concise study made from the engineering point of view. Methods and instruments for determination of mechanical and other properties of snow are developed (tensile strength, shear strength, penetrability, permeability, moisture content, etc.). The report gives description of the laboratory equipment with sketches and wiring diagrams (sample tubes, hydraulic press, triaxial apparatus, disaggregator, X-ray density gage, tensile strength and shear apparatus, penetrometer, air permeability apparatus, high speed compactor, drop cone apparatus and calorimeter). The theory of the mechanical behavior of snow is outlined, as well as the theory of the measurement of snow properties. A detailed table for the conversion of snow density to absolute porosity is presented and a few preliminary experimental results are discussed (cross section number versus density, specific velocity of deformation of compacted snow, load vs. density, penetration vs. pressure for various snow densities, etc.). (*Same item as* 4.11–227, Nov. 1953, *MAB.*) *Subject Headings:* **1. Snow laboratory equipment 2. Snow physics 3. Snow mechanics.**—*A.A.*

7G–154 551.578.46:656

†Bekker, M. G., **Snow studies in Germany.** *National Research Council of Canada. Associate Committee on Soil and Snow Mechanics, Technical Memorandum,* No. 20, May **1951.** 83 p. 94 figs., 200 refs. **DWB**—This highly detailed report results from a visit to Germany to contact German

workers. It includes a short summary of the physical properties of snow: specific weight, crystalli structure, snow strength, friction and moisture content. Pt. B deals with the problem of sn clearing by snow ploughs and snow blowers, including investigation and assessment of availal equipment, establishment of theoretical basis of snow clearing technique, and results of experimen work. Pt. C deals briefly with snow transport by air currents, and Pt. D with avalanche and s research. The report is illustrated by a wealth of photographs and diagrams and is richly doc mented. *Subject Headings:* **1. Snow accumulation 2. Snow removal 3. Avalanches.**—*C.E.P.B.*

7G–155 551.573:551.578.

de Quervain, M., **Zur Verdunstung der Schneedecke.** [On the evaporation of snow cover *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B,* 3:47–64, **1951.** 5 figs., 4 tabl 6 refs. English and French summaries p. 47–48. **DLC.** Translation by M. McClain issued a *U. S. Corps of Engineers. Snow Investigations, Research Note,* No. 8, **1952.** 22 p. **DWB**—O servations of evaporation from snow surface, mainly on Weissfluhjoch (2670 m) but also at Dav (1550 m) and summit of Weissfluhjoch (2850 m), are tabulated with temperatures of air and sn surface, wind velocity, etc. Observed evaporation agreed well with TRABERT's 1896 formula f wind speeds 0.7 to 3 m/sec. Some observations of diurnal variation are given. Annual variation sun and shade Jan.–June showed a maximum in May–June. (*Same item as* 3.2–131, Feb. 195 *MAB.*) *Subject Headings:* **1. Evaporation of snow 2. Weissfluhjoch, Switzerland 3. Davo Switzerland. I. McClain, M.** (*ed.*).—*C.E.P.B.*

7G–156 551.579

Hildebrand, Carver E., **The general snowmelt equation.** U. S. Corps of Engineers, Proje CW-171, Technical Bulletin No. 13, May 25, **1951.** 27 p. table, 38 refs., 20 eqs. **DWB**—Th bulletin is a summary of the various heat transfer processes involved in the melting of snow and the available means by which their magnitudes may be estimated. A general snowmelt equatio is formulated to express the melt from any combination of these processes. Practical applicatio is discussed wherein the general equation may be simplified by consideration of the relative in portance of the individual processes. (*Same item as* 4.9–199, Sept. 1953, *MAB.*) *Subject Heading* **1. Snowmelt 2. Snow metamorphosis.**—*Author's abstract.*

7G–157 551.525.2:551.578.

Nechaev, I. N., **O metodike nabliudenii temperatury poverkhnosti snega.** [Methods of tem perature observations on a snow surface.] *Leningrad. Glavnaia Geofizicheskaia Observatorii Trudy,* No. 25(87):84–87, **1951.** 2 figs. **DLC.** Translation into English by N. T. Zikeev, issue by U. S. Corps of Engineers, July **1953.** 7 p. 2 figs. Mimeog. **DWB**—A test was made fro Feb. 27 to March 31, 1950, at the Central Geophysical Observatory, Leningrad, on an experiment plot of the Division of Methods of Observation, to determine the range of experimental error measuring snow surface temperatures and to find a better method of installing thermometers, a well as to determine the cause of errors. Several thermometers were installed: 1) on the snow surfac 2) under the snow surface, 3) partly buried and 4) at 2 m elevation. The thermometers install on the snow surface often show positive temperatures owing to incoming radiation (in daytim and to "undermelting" which results in the thermometer recording only its own temperature Graphs show magnitude of error for the different installations during the course of a clear or a cloud day, or night, respectively. (For other abstracts, *see* 3.8–156, Aug. 1952 and 5.9–172, Sept. 195 *MAB.*) *Subject Headings:* **1. Snow surface temperature measurements 2. Snow temperatur measurement accuracy 3. Observation techniques 4. Translations. I. Zikeev, N. T.** (*trans.* —*M.R.*

7G–158 551.579

Shioda, Isamu, **Snow-melting by means of black earth scattering.** *Seppyo* (*Snow and Ice* Tokyo, 12(5):179–182, **1951.** diagrs., tables. In Japanese. **DWB**—To speed up the snow mel in a field, the effect of scattering black earth is examined. Snow was melted 4 to 8 days earlier i response to the frequency and the magnitude of earth scattering. *Subject Heading:* **1. Snow mel rate.**—*H. Arakawa.*

7G–159 551.578.46:551.52

*Sulakvelidze, G. K., **Nekotorye radiatsionnye svoĭstva sukhogo snega.** [Some radiation prop erties of dry snow.] *Akademiia Nauk Gruzinskoĭ SSR, Soobshcheniia,* 12(8):467–473, **1951.** 2 figs 2 tables, 6 eqs., 3 refs. **DLC**—Results of observations made during 1946–1950 in mountain region at 2000–5600 m above s.l. are analyzed. Dependence of albedo on state of snow cover, angle o sun rays, as well as on the degree of moistening and purity of snow cover are discussed. The maxi mum albedo was 97.2% for dry snow with vertical illumination. Investigations of sunlight penetra tion showed that the rays of 6500–6600 A are absorbed in the upper 5–7 cm layer. Of the tota

mount of solar radiation, 13.7% penetrated to a depth of 10 cm, 3.3% to 20 cm and 1.8% to 40 cm. *Subject Headings:* **1. Radiation properties of snow 2. Albedo of snow 3. Georgia, U.S.S.R.**—*T.Z.*

7G–160 551.578.41:551.508.26

*Takahashi, Hiroji, **On the snow temperature measured by the mercurial thermometer.** *Seppyo* (*Snow and Ice*), Tokyo, 12(6):213–216, **1951.** tables. In Japanese. **DWB**—Discusses results of measuring snow temperature with different angles of exposure of thermometer. *Subject Heading:* **Snow temperatures.**—*M.R.*

7G–161 551.578.46:551.578.41

Tushinskiĭ, G. K., **Evoliutsiia snezhnoĭ tolshchiny.** [Evolution of snow thickness.] *Voprosy Geografii*, No. 24, **1951.** p. 350–379. 10 figs., 5 tables. **DLC**—A comprehensive summary of experimental and field studies on the evolution of a snow cover which brings about the formation of friable horizons within snow giving rise to avalanches of old dry firn and of snow layers, on means of forecasting snowslides, and on the process of firn formation and the transformation of firn into glacial ice. These studies were carried out at the Khibinsk Geographical Station of Moscow University and on the Ptysh and Alibek Glaciers. The following topics are discussed: the factors of firn formation, namely the temperature regime of the snow cover and crystallization, developmental stages in the formation of snow cover; variations in the stratigraphy of snow thickness such as the process of transition of one type of snow into another and the conditions favoring the formation of friable horizons; the evolution of the mechanical properties of snow thickness; the compressibility of snow; determination of the degree of cohesion between different layers of snow; and the classification of snow types. Photographs illustrating various stages in the formation of firn are presented. (*Same item as* 3.10–245, Oct. 1952, *MAB.*) *Subject Headings:* **1. Snow cover research 2. Snow physics 3. Firn formation 4. Avalanches 5. U.S.S.R.**—*I.L.D.*

7G–162 551.578.46:551.571

Yosida, Zyungo and Kozima, Kenzi, **Transfer of water vapour in snow cover, Pt. 1.** *Seppyo* (*Snow and Ice*), Tokyo, 12(4):121–127, **1951.** photos. In Japanese; English summary p. 1. **DWB**—Experiments were conducted in a flat box (2 cm wide, 6 cm long, 5 mm high) filled with snow, placed on the table of a microscope in a cold chamber. An electric heater placed at one end of the box produced a horizontal temperature gradient in the snow. Water vapor diffused from the hotter part of the snow to the colder part. The water vapor must have been transferred from particle to particle. The absence of depth hoar is no evidence for the absence of diffusion of water vapor. A snow cover is commonly colder in the upper part and water vapor is continually diffusing upwards. The depth hoar is rarely found in snow cover because the temperature gradient in it is usually small. Snow crystals change form slowly, as is well known, without melting. It was found that the presence of diffusion of water vapor due to a temperature gradient considerably enhances the change of form of the snow crystal. *Subject Headings:* **1. Snow cover 2. Water vapor diffusion through snow cover.** —*Authors' abstract.*

7G–163 551.521.61:551.578.46

*Berger, P., **Estimation of net longwave radiation from snow.** *U. S. Corps of Engineers. Snow Investigations, Research Note* [No. 7], Oct. 10, **1952.** 26 p. 4 tables, 2 figs., 4 refs., eqs. **DWB**—Observations of incident (all-wave) and net radiation of short wave incident and reflected radiation made from Oct. 27 to Nov. 30, 1951, at the Central Sierra Snow Lab., were analyzed and computed, and comparison made with calculations from an adapted Brunt formula. Air and snow surface temperatures, dew point, cloud height and sky cover data were used to calculate net long wave radiation. Two Gier-Dunkle radiometers were used for all-wave incident and net radiation, and shortwave records were obtained from Eppley pyrheliometers located within 50 ft of the other radiometers. Since first attempts at computation gave unsatisfactory results, second general equation was tried. This gave better results, but when simplified to $C_7+C_8W=R_{net}+.00363t_s+.344$ accounted for only 24% of variation in net longwave radiation in all weather compared to 62% for the general equation. Reliability of daytime data is questionable. Average net longwave radiation on clear night was 0.10 ly/min. Heat loss from pack during 24 hour period was 127 ly in clear weather and 105 ly in cloudy weather. All data, both detailed observations and computations therefrom, and regression curves for several attempts, are included in this report which supplements the Feb. 28, 1952 report entitled "Trial estimates of net longwave radiation from snowpacks." (*Same item as* 5.6–134, June 1954, *MAB.*) *Subject Headings:* **1. Radiation from snow cover 2. Central Sierra Snow Lab., California.**—*M.R.*

1952

7G–164 551.525.5:551.578.4

Crawford, C. B., **Soil temperatures and frost penetration.** *Canadian Soil Mechanics Conference 5th, Ottawa, Jan. 10–11, 1952, Proceedings*, p. 47–50. **DWB**—Investigations on frost penetratio conducted during the last three years by the Div. of Building Research, National Research Counci Canada, are reported. Measurements were made in sand and clay test pits, under streets and a locations of frozen water mains in Ottawa (these latter were recorded by the Water Works Dept. Data on the effect of some of the variables were collected. It was found that "frost penetration i reduced by approximately 2 feet for each foot of loose disturbed snow." Some other project investigating frost penetration are mentioned. (*Same item as* 4.11–167, Nov. 1953, *MAB.*) *Subject Headings:* **1. Frost penetration in soil 2. Snow cover influences 3. Ottawa, Canada.**—*G.T.*

7G–165 551.525.4:551.578.4

De Backer, Simon, **Temperature superficielle du sol sous le gazon recouvert de neige, hive 1950–1951 à Uccle.** [Surface temperature of the soil under grass covered with snow during th winter 1950–51 at Uccle.] *Belgium. Institut Royal Météorologique, Mémoires*, v. 51, 1952. 8 p 3 figs., table. **DWB**—Daily soil temperatures (Nov. 30, 1950–Jan. 8, 1951) at depths of 5, 20 an 100 cm were measured by means of copper-constantan thermocouple; and air temperature wa measured at 1.50 cm. A table gives these values together with mean surface temperature of th soil at 1200 h, maximum and minimum temperatures between 0 and 2400 h, maximum and minimu air temperature between 0 and 2400 h, thickness of snow cover, wind direction and velocity an source of water received in the rain gage and a graphic representation of these data together wit methods of correlation and the course of mean surface soil temperature from Nov. 18 to Jan. 9 1951 are given. The coefficient of thermal diffusion of the snow is calculated 1) by the relationshi between amplitudes and 2) by the displacement of sinusoidal waves and a close agreement is found $k = .0012$ and .0010, respectively. The protective action of snow cover upon vegetation with refer ence to temperature, humidity and aeration are discussed. (*Same item as* 5.1–183, Jan. 1954 *MAB.*) *Subject Headings:* **1. Soil temperatures 2. Snow cover effects.**—*I.L.D.*

7G–166 551.573:551.578.46(494

de Quervain, M. and Zingg, Th. (*Davos, Switzerland*), **Ueber die Verdunstung der alpine Schneedecke.** [Evaporation of alpine snow cover.] *I.U.G.G. Association of Scientific Hydrology Brussels*, 1951, *Transactions*, v. 1:154–160, **1952.** 4 figs., 3 tables, 7 refs. **DWB**—Evaporation o snow is assumed to be proportional to the saturation deficit between the water vapor pressure of the air and saturation pressure over ice at the temperature of the snow, as well as proportional to the absolute temperature and the square roots of pressure and wind speed. The agreement with actua measurements was very close for both evaporation and condensation. Samples of measurement data are given, as well as monthly totals for snow evaporation in shade and in the sun. (*Same item as* 5.2–187, Feb. 1954, *MAB.*) *Subject Headings:* **1. Evaporation of snow 2. Condensation 3. Switzerland.**—*A.A.*

7G–167 551.578.4

Gerdel, R. W., **Snow thermodynamics offers better understanding of mechanical properties of snow.** *Civil Engineering*, 22(12):46–48, Dec. 1952. 6 figs. **DLC**—The importance of a thermo dynamic study of snow is discussed and results of investigations of snow cover and its physico mechanical properties are reviewed. Special attention was given to research planned by Snow, Ice and Permafrost Research Establishment of the U. S. Quartermaster Corps. *Subject Headings:* **1. Snow thermodynamics 2. Snow mechanics.**—*N.T.Z.*

7G–168 551.579:551.509 551.578.46

†*Hoeck, Erwin, **Der Einfluss der Strahlung und der Temperatur auf den Schmelzprozess der Schneedecke.** [Influence of radiation and temperature on the melting process of snow cover.] *Beiträge zur Geologie der Schweiz, Geotechnische Serie, Hydrologie*, No. 8, **1952.** 36 p. 22+tables (some fold.), 22 figs., 36 refs., eqs. **DWB**—One of the best monographs on the melting of snow. The heat balance, retention and melting depth of snow cover are discussed, with special emphasis on the effect of season, height, cloudiness, exposure, slopes and forests on the radiation balance. The snow albedo depends on temperature. Furthermore, it is shown how to use standard meteorological data (as temperature and humidity) in order to evaluate the melting process. Computed runoff shows good agreement with observed values. Numerous tables and graphs facilitate the computation of the radiation balance, and give the basic data accumulated at numerous stations. (*Same item as* 4.11–9, Nov. 1953, *MAB.*) *Subject Headings:* **1. Snow physics 2. Snow melt 3. Runoff forecasting 4. Switzerland.**—*A.A.*

7G–169 551.521.14:551.578.46

Middleton, W. E. Knowles and Mungall, A. G. (*Natl. Res. Council, Ottawa*), **The luminous directional reflectance of snow.** *Optical Society of America, Journal*, 42(8):572–579, Aug. **1952.** 6 figs., 11 refs., eqs. Also: Christie, A. W. (*Harmodsworth, England*), [**same title**] *Ibid.*, 43(7):621–622, July **1953.** fig., 5 refs., 12 eqs. **DWB**—By means of a specially constructed portable goniophotometer, the directional reflectance of numerous surfaces of snow was measured during the winter of 1951–1952. While some samples reflected more nearly diffusely than others, all showed much specular reflection at high angles of incidence. An approximate theory of the specular reflection is given and its results compared with experiment. The experimental fact that the angle of maximum reflectance is greater than the angle of incidence is explained by the theory.—Christie, after elaborating on several points of the Middleton-Mungall theory, takes up the experimental determination of reflection data, especially the problems arising from the relative sizes of sample, source and receiver. He finds that the angles subtended by the source, the sample and the receiver appear to be too large in the goniophotometer of Middleton and Mungall. Attention is also called to the fact that data obtained through the technique under review cannot be easily adapted to specific needs, for example those of aviators. (*Same item as* 4.4–141 and 6.1–168, April 1953 and Jan. 1955, *MAB.*) *Subject Headings:* **1. Spectral reflectivity 2. Albedo of snow 3. Goniophotometers.**—*G.T. and authors' abstract.*

7G–170 551.521:551.578.46:551.588.6

†Miller, David H., **Some forest influences on thermal balance over the snowpack.** *U. S. Corps of Engineers. Snow Investigations, Research Note* (unnumbered), Dec. 15, **1952.** 37 p. 66 refs. **DWB**—Data on the transmission of radiation through forests of various trunk densities and through canopies of various densities, on interception of radiation and snowfall, on albedo of snowpack within the forest, on forest albedo, on heating of forest canopy by radiation, on longwave exchange between snow and canopy, etc., were collected from literature in forestry, botany and meteorology and particularly from reports (published and unpublished) of Cooperative Snow Investigations. An attempt was made to coordinate the material coming from various sources and the results are summed up and presented in graphical form. A bibliography of international literature containing 56 papers dealing with the subject is added. (*Same item as* 4.1–119, Jan. 1953, *MAB.*) *Subject Headings:* **1. Forest thermal balance 2. Forest radiation interception 3. Albedo 4. Forest snowpack.**—*G.T.*

7G–171 551.578.41:551.579.2

Milosavljević, M., **Temperatura u snežnom pokrivaču i iznad njega za vreme topljenja snega.** [Temperature in and above a snow cover during snow melt.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 1(3/4):56–59, July/Oct. **1952.** 2 tables. **DWB**—Results of temperature measurements made at Belgrade at 1-hour intervals (9 a.m.–2 p.m.) during snow melting on Feb. 12 and 21, 1952 are tabulated. Temperatures were taken at ground level under a snow cover or without snow, at the top of the snow cover and at various heights up to 2 m above the ground. Corresponding data on cloudiness, sunshine and wind are given. On Feb. 12 at 2 p.m. ground surface temperature was 0.7°C under 4½ cm snow cover and 12.4°C without snow. *Subject Headings:* **1. Snow temperatures 2. Snow melt 3. Belgrade, Yugoslavia.**—*G.T.*

7G–172 551.521.14:551.578.46

Sauberer, Franz, **Beiträge zur Kenntnis des Strahlungsklimas von Wien.** [Contribution to the knowledge of the radiation climate of Vienna.] *Wetter und Leben*, 4(11/12):187–192, Dec. **1952.** 8 tables, 8 refs. **DLC**—Includes comparative tables of monthly outgoing radiation values and long wave radiation balance at Vienna for snow, bare soil and the Danube's surface, under existing cloud conditions. Monthly values of albedo for the Danube surface and for meadow land are also tabulated, accounting for snow cover. (*For fuller abstract, see* 5.2–137, Feb. 1954, *MAB.*) *Subject Headings:* **1. Radiation climate of Vienna 2. Albedo of snow 3. Vienna, Austria.**—*G.T.*

7G–173 551.311.121(71)

Sharp, Robert R., **Meltwater behaviour in firn on upper Seward Glacier,—St. Elias Mountains, Canada.** *I.U.G.G. Association of Scientific Hydrology, Brussels*, 1951, *Transactions*, v. 1:246–253, pub. **1952.** 5 figs., 5 refs. **DWB**—Study deals with the vertical meltwater circulation through the firn layer in an isothermal condition at 0°C. Measurements were made in 60°23′N and 139°53′W with meltwater pans located at different depths. Attempts to measure horizontal flow were unsuccessful. The hourly meltwater flow (about 15 cm/hr) is compared with the course of air temperature. The water table in the glacier fluctuates considerably from year to year. *Subject Headings:* **1. Glacier ablation 2. Glacier firn 3. Seward Glacier, Canada.**—*A.A.*

7G–174 551.521.14:551.578.46

U. S. Corps of Engineers and U. S. Weather Bureau, **Trial estimates of net longwave radiation from snowpacks.** *U. S. Corps of Engineers and U. S. Weather Bureau, Cooperative Snow Investiga-*

tions, Research Note, SPDGC 109-52, Feb. 28, 1952. 13+p. figs., tables, 19 refs. **DWB**—A Gier–Dunkle radiometer was used for measurements of the effective longwave radiation at the Central Sierra Laboratory. The observed results are compared with values estimated by methods of BRUNT and ELSASSER. It is suggested to use the more simple method of BRUNT. (*Same item as* 4.4–132, April 1953, *MAB.*) *Subject Headings:* **1. Terrestrial radiation 2. Snow cover 3. Infrared radiation 4. Radiometers. I. Brunt, P. II. Elsasser, Walter M.**—*A.A.*

1953

7G–175 551.525.4:551.578.46

Benfield, A. E., **The effect of accumulation on temperature within a snowfield.** *Journal of Glaciology*, 2(14):250–254, Nov. 1953. 4 figs., 3 tables, 6 refs. English and German summaries p. 250. **DLC**—Assuming annual temperature variation at surface of a snowfield to be a sine curve (0 to −20°C), diffusivity 7.3×10^{-3} cm²/s and constant snowfall at rate of 0, 4 and 8 m/year, temperatures are calculated at different depths and times of year. Owing to blanketing effect of snow, the minimum temperature (in June) at depths of 4–8 m is 5–6°C lower with 8 m snowfall than with no snow. (*Same item as* 5.3–202, March 1954, *MAB.*) *Subject Heading:* **1. Snow cover temperatures.**—*C.E.P.B.*

7G–176 551.508.21:551.578.4

*California. Univ. Institute of Engineering Research, [**Snow characteristics.**] Progress Report for the year ending June 27, 1953, on Contract DA-11-190-ENG-3. June 27, 1953. 73 p. tables, figs., refs. p. 32, eqs. **DWB**—Research accomplished along the following lines: 1) Design and development of a heated cavity reflectometer and of a paraboloid reflectometer for the measurement of spectral reflectivity and reflectance of various materials for use under arctic conditions, 2) Development of a two-radiometer method and an emissivity meter for the measurement of surface emissivity at or near ambient temperature, 3) Development of a solarimeter and albedometer for the measurement of transmissivity and absorptivity of snow. The report contains detailed descriptions and sketches, photos and test results. *Subject Headings:* **1. Radiation meters 2. Radiation properties of snow.**—*A.A.*

7G–177 551.573:551.578.46

*Diamond, Marvin, **Evaporation or melt of snow cover.** *U. S. Snow, Ice and Permafrost Research Establishment, Research Paper*, No. 6, Nov. 1953. 6 p. 2 figs., 5 tables, 10 refs., 2 eqs. **DWB**—Analyzing the heat balance of the snow surface, it was found that very little evaporation can occur without melting. The evaporation potential decreases with higher air temperatures. A nomogram shows the conditions for condensation or evaporation from a snow surface depending on air and snow temperature and relative humidity. (*Same item as* 6.3–218, March 1955, *MAB.*) *Subject Headings:* **1. Snow melt 2. Evaporation of snow.**—*A.A.*

7G–178 551.521.14

Dirmhirn, Inge, **Einiges über die Reflexion der Sonnen- und Himmelsstrahlung an verschiedenen Oberflächen (Albedo).** [The reflection of solar and sky radiation on different surfaces (albedo).] *Wetter und Leben*, 5(3/4):86–94, May 1953. 10 tables, 14 refs. **MH-BH**—Daily means of albedo for water surfaces, ice and snow surfaces, for green vegetation stands, for soil, sand and for rocks are given. The tables give data on: 1) reflection of solar radiation and of sky radiation from water surfaces with slight wave movement at different sun elevations, 2) daily means of albedo of water surfaces for solar and sky radiation in the case of cloudless skies, 3) daily means of the albedo of water surfaces for global radiation during varying degrees of cloudiness, 4) albedo for various types of snow and ice surfaces, 5) albedo of global radiation for green fields and forests, 6) albedo of a horizontal meadow near Vienna for every month of the year, and 7) albedo of sandy, clay and plowed soil and of dark and light rocks. (*Same item as* 5.2–135, Feb. 1954, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Albedo.**—*I.L.D.*

7G–179 551.521.14:551.578.46

Dunkle, R. V. and Gier, J. T., **Radiation in a diffusing medium with applications to snow.** California. Univ. Institute of Engineering Research, Contract DA-11-190-ENG-3, [Report], Nov. 15, 1953. 14 p. table, 2 figs., 3 refs., eqs. **MH-BH**—A theoretical study of albedo (transmission and reflection) characteristics of clean snow of various ages. It is shown that melting, compaction, etc. alter the shape and size of crystals thus changing (lowering) the albedo until the limiting condition of homogenous ice with very low albedo is reached. The transmission through an ideal snow cover is directly related to albedo in an exponentially decreasing manner. An analysis is presented with appropriate tabular data to show the correlating factors, the first parameter is a characteristic of the surface snow condition and the second of the snow beneath the surface. BEN-

FORD's (1946) results are compared with the author's in the above table. (*Same item as* 6.1–169, Jan. 1955, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Radiation transmission in snow pack.** —*M.R.*

7G–180 551.508.21:551.578.46

*Dunkle, R. V. and Gier, J. T., **Snow emissivity meter and its use in evaluating the emissivity of ice, frozen ground and other materials.** California. Univ. Institute of Engineering Research, Contract DA-11-190-ENG-3, [Report], Dec. 15, 1953. 14 p. 2 figs., graph, tables, 2 refs., 7 eqs. **MH-BH**—Placing a double walled "hohlraum" of constant temperature (60–70°F) with an opening over the sample surface, the long wave radiation energy emitted by the sample is intercepted by a special mirror and focused upon a thermopile detector. The emissivity of ice between 0.8–18.9°F was found as 97%, other values are given for frozen soil, metal and paint combinations but not for snow. The estimated experimental error of single measurements is ±2%. *Subject Headings:* **1. Radiation meters 2. Long wave emissivity.**—*A.A.*

7G–181 551.573:551.511:551.311.12

Hoinkes, H. and Untersteiner, N. (*Innsbruck*), **Wärmeumsatz und Ablation auf Alpengletschern. I. Vernagtferner** (Ötztaler Alpen, August 1950). [Heat balance and ablation on Alpine glaciers. Pt. I, Vernagtferner, Ötztal Alps, Aug. 1950.] *Geografiska Annaler*, 39(1/2):99–158, 1952. 15 figs., 16 tables, bibliog. p. 156–158, 15 eqs. English summary p. 153–155. Also: Hoinkes, H., . . . **II. Hornkees** (Zillertaler Alpen) Sept. 1951. [Pt. II, Hornkees, Zillertal Alps, Sept. 1951.] *Ibid.*, 35(2):116–140, 1953. 6 figs., 10 tables, 10 refs. Also shorter English version, Hoinkes, H.: **Measurement of ablation and heat balance on Alpine glaciers with some remarks on the cause of glacier recession in the Alps.** *Journal of Glaciology*, 2(17):497–501, April 1955. 2 figs., table, 15 refs. **DWB**—Measurements of ablation and heat balance on glaciers in the Eastern Alps in summer 1950–53 at 2262–2973 m show a mean daily ablation of 3.16–4.64 cm water. Of this, 58–84% is due to short-wave radiation, in spite of a mean cloudiness of nearly 5 tenths. Air heat contributes 15–30% and latent heat of condensation 5–15%. Ablation depends very largely on albedo due to fresh snowfall. Thus glacier retreat since 1850 in the Alps is attributed to less cloud and snowfall in summer. (*Also abstracted as* 5.6–195 and 6.2–234, June 1954 and Feb. 1955, *MAB.*) (*See also:* Hoinkes, H., **Zur Mikrometeorologie der eisnahen Luftschicht.** [On the micrometeorology of the air layer near ice.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(4):451–458, 1953. 2 figs., 5 tables, 6 refs. English and French summaries. (For abstract, *see* 4.10–235, Oct. 1953, *MAB.*) *Subject Headings:* **1. Glacial ablation 2. Thermal balance of snow cover 3. Micrometeorology of glaciers 4. Alps.**—*C.E.P.B.*

7G–182 551.573:551.578.4

Kehrlein, Oliver; Serr, Eugene, Sr. (*both Sierra Club*); Tarble, Richard D. and Wilson, Walter T. (*both U. S. W. B.*), **High Sierra snow ablation observations.** *Western Snow Conference, 21st, Boise, Idaho, April* 1953, [*Proceedings*], p. 47–50. Also: Church, James E., **Further on the evaporation and melting of snow at high altitudes.** *Ibid.*, p. 51–52. fig., table, 5 refs. **DWB**—Gives hourly data for two days for snow melt, dry and wet bulb temperature, sunshine and other weather conditions. The measurements were made on the crest of Mt. Whitney. Snow evaporation or condensation affected the total ablation only very little, but apparently much melt water is later evaporated from moist soil and water surfaces. CHURCH stresses that evaporation of snow is definitely important in the total balance, while the Mt. Whitney observations were made during the summer with prevailing snow melt. (*Same item as* 6.8–278, Aug. 1955, *MAB.*) *Subject Headings:* **1. Snow ablation 2. Evaporation of snow 3. Mt. Whitney, Calif.**—*A.A.*

7G–183 551.593.53:551.311.18

Moller, Fr., **Zur Erklärung des Eisblinks.** [Explanation of the ice blink.] *Polarforschung*, Kiel [Ser.] 3, 23(1/2):236, 1953. **DWB**—Author calculated that with sun 14° above horizon, sky 1° above horizon is three times as bright with albedo 70% (ice) as with albedo 10% (water). The color is equivalent to saturation of 13% at 436 mμ over ice, 27% at 482 mμ, i.e. twice as blue, over sea. (*Same item as* 6.11–354, Nov. 1955, *MAB.*) *Subject Heading:* **1. Ice blink.**—*C.E.P.B.*

7G–184 551.578.46

Müller, Hans Gerhard, **Zur Wärmebilanz der Schneedecke.** [On the heat balance of snow cover.] *Meteorologische Rundschau*, 6(7/8):140 143, July/Aug. 1953. fig., table, 8 refs. **DWB**—On low ground humidity is more important than warmth in melting snow. A grid of temperature, vapor pressure, relative humidity, dew point and equivalent temperature shows a line (through vapor pressure 4.58 mm) below which no melting is possible. (*Same item as* 5.3–265, March 1954, *MAB.*) *Subject Heading:* **1. Snow melt.**—*C.E.P.B.*

7G–185 551.578.4

Rikhter, G. D., **Nekotorye zakonomernosti formirovaniia i rasprostraneniia snezhnykh zanosov i printsipy organizatsii bor'by s nimi.** [Laws of the formation and extension of snow drifts and some suggestions for prevention.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.*, No. 1:15–22, **1953.** fig., table, 13 refs. **DLC**—Author discusses the principal laws of snow drift formation its transport by wind, and its accumulation on various types of relief, mainly in depressions near road embankments and natural and artificial barriers. In the problem of snow drifts, attention is given to the retention of snow in proximity to objects protected by costly wooden snow screens and hedges while the relationship between snow deposit, transport and accumulation processes is overlooked. Attention should be concentrated on decreasing the quantity of transported snow by preventing blowing from areas where snow is deposited. Such measures are similar to those for prevention of soil erosion and gully formation and can be of short (snow plowing and snow retaining obstacles) or long duration (tree or shrub belts). A map of the U.S.S.R. showing 4 zones according to intensity of snow drift occurrences is included. *Subject Heading:* **1. Snow drift prevention.**—*A.M.P.*

7G–186 551.579.

*Sudo, Isao and Soda, Mikio, **Observations on the conditions of snow cover and snow-melting at Shiozawa, Niigata Prefecture.** *Seppyo* (*Snow and Ice*), Tokyo, 15(3):1–4, Dec. **1953.** 3 figs. 6 tables. In Japanese. **DLC**—The authors computed the rate of melting snow in terms of the decrease of the depth of snow cover divided by the integrated value of daily mean temperature over the period of observation at Shiozawa, Niigata Prefecture. This rate is fairly constant and equal to -1.20 ± 0.22 cm/day. *Subject Headings:* **1. Snow melt rate 2. Niigata Prefecture, Japan.**—*H. Arakawa.*

7G–187 551.578.46:6

TSvetkov, M. I., **Vliianie snegovogo pokrova na perezimovku ozimykh kul'tur.** [Snow cover influence on winter crops.] *Sovetskaia Agronomiia*, 11(1):79–80, **1953.** ref. **DLC**—The usually applied methods of snow retention cannot be used for fields with winter crops. The most effective results were obtained in Siberia by sowing sunflower and lucerne with false flax around winter crop fields. The resulting even distribution of snow cover prevents the freezing of winter crops. The depth of frost penetration into soil in such an area was not more than 60 cm as compared with 150–200 cm in a field without snow retention; the soil temperature near surface did not go below $-10°C$ in a protected field as compared with temperatures of $-25°C$ in other areas. *Subject Headings:* **1. Snow cover influences on winter crops 2. Soil freezing protection 3. Winter crop protection.**—*N.T.Z.*

7G–188 551.579.2:551.578.46:551.509

U. S. Corps of Engineers. Snow Investigations, **Snow-cover depletion and runoff.** Its *Research Note*, No. 16, Portland, Ore., Sept. 30, **1953.** 27 p. 8 figs., 7 charts, 4 tables, 18 refs. **DWB**—Relations between depletion of snow cover during spring and resulting runoff are worked out quantitatively on the basis of observations made during 1947 on the Upper Columbia and Central Sierra Snow Laboratory Basins and for other years in those two basins and the Fraser and King River Basin. It was found that south facing slopes are about 20 days ahead of north slopes in reaching a given per cent of snow cover. Thus diversified terrain causes snow melt season to last twice as long as in homogeneous terrain. Snow cover shrinks slowly in area at first, then more and more rapidly. Relation between snow cover and future runoff improves as season advances and snow cover is depleted. Several methods of estimating snow cover extent are described and evaluated. Data are given in tables and working nomograms presented and their use described. (*Same item as* 6.3–270, June 1955, *MAB.*) *Subject Headings:* **1. Snow melt forecasts 2. Snow cover duration 3. Snow melt runoff 4. Upper Columbia Snow Laboratory, Montana 5. Central Sierra Snow Laboratory, California. I. Miller, David H.**—*M.R.*

7G–189 551.579.2:551.509.5

§*U. S. Corps of Engineers. Snow Investigations, **Thermal balances and snowmelt runoff associated with upper-air flow over the western United States in May 1949 and May 1950.** Its *Research Note*, No. 15, Portland, Ore., Sept. 15, **1953.** 24 p. 6 figs., 3 tables, 22 refs. **DWB**—A large heat surplus in the thermal balance and a rapid increase in runoff with a lag of one to three days was observed at Bear Creek, Montana; Blue River, Oregon and Castle Creek, California snow laboratories when a high pressure plateau in the 500 mb surface lay over the three headwater basins studied. Data for the thermal balance at the snow surface, and at the 700 and 500 mb surfaces during May 1949 and on May 9 and 12, 1950 are added and discussed. *Subject Headings:* **1. Runoff forecasting 2. Snowmelt runoff 3. Western United States. I. Miller, D. H.**—*A.A.*

7G–190 551.578.46

Yosida, Zyungo, **On the relation between snow depth measured by snow stake and the area of the ground surface released by snow cover in the early spring.** *Seppyo* (*Snow and Ice*), Tokyo, 14(4):115, March **1953.** 2 figs. In Japanese. Also in *Journal of Meteorological Research*, Tokyo, 3(6):555–556, July 1953. In Japanese, English summary. **DWB**—Brief note, with scatter graph showing relation between depth of snow in cm and % of bare ground. Also a schematic model of surface of melting snow in early spring. *Subject Headings:* **1. Snow cover—snow depth relationships 2. Snow melt mechanism.**—*M.R.*

7G–191 551.578.46:536.21

Yosida, Zyungo, **Physical properties of deposited snow (metamorphosis of snow crystals, heat conductivity of snow).** *Researches on Snow and Ice*, Tokyo, No. 1:127–138, Oct. **1953.** 16 figs., 3 refs., 13 eqs. In Japanese. **DWB**—Theoretical approach, including heat transfer calculations, and excellent microphotographs. *Subject Headings:* **1. Thermal properties of snow 2. Heat exchange in snow.**—*M.R.*

1954

7G–192 551.578.46:551.573

Bossolasco, Mario, **Sulla micrometeorologia del manto nevoso.** [Micrometeorology of snow cover.] *Geofisica e Meteorologia*, Genoa, 2(1/2):1–2, Jan./April **1954.** 2 refs., 2 eqs. **DWB**—A fresh and recently formed winter cover of dry snow in high mountain altitudes, having no ice layer as a protective base, evaporates quickly through a process described as internal sublimation—the action exerted on the ice crystals of the upper layers of the snow cover by the vertical circulation of water vapor. *Subject Heading:* **1. Evaporation of snow.**—*L. Piermarini.*

7G–193 551.579.2:551.588.6

†Boyer, Peter B. (*U. S. Corps of Engineers, Portland, Ore.*), **Heat exchange and melt of late season snow patches in heavy forest.** *Western Snow Conference, Salt Lake City, April* 1954, *Proceedings*, p. 54–70. pub. **1954.** 8 plates, 20 refs., 18 eqs. **DWB**—Data on melting of remnants of snow in dense forests of Oregon at 4,250 ft elevation obtained during a warm spell from July 7–15, 1952, are analyzed in great detail to show that 85% of the melt was due to air temperature and humidity and 15% to short-wave radiation. The 85% is due to long-wave radiation (50%), convective heat exchange (20%) and latent heat of condensation (15%). A melt equation was derived as follows: $M = \frac{60Q_n}{80}$ cm/hr or $0.296Q_n$ in/hr where Q_n is sum of effective heat components. (Revision and condensation of U. S. Corps of Engineers Res. Note 11.) *Suqject Headings:* **1. Heat exchange in forests 2. Snow melt in forests 3. Forest microclimatology 4. Willamette Basin, Ore.**—*M.R.*

7G–194 551.311.1 551.578.4:536.2

Coles, Willard D. (*Lewis Flight Propulsion Lab., Cleveland*), **Experimental determination of thermal conductivity of low-density ice.** *U. S. NACA, Technical Note*, No. 3143, March **1954.** 12 p. diagrs., photo. **DWB**—The thermal conductivity of low-density ice has been computed from data obtained in an experimental investigation of the heat transfer and mass transfer by sublimation for an iced surface on a flat plate in a high-velocity tangential airstream. The results are compared with data from several sources on the thermal conductivity of packed snow and solid glaze packed-snow values, and the extension of the curves for packed snow to the solid ice regime indicates that the curves are applicable to ice over the entire density range. *Subject Heading:* **1. Thermal conductivity of snow.**—*NACA abstract.*

7G–195 551.578.46:551.584.4 551.579.2

Craddock, George W., **Water yield from snow as affected by consumptive water losses.** *Western Snow Conference, Salt Lake City, April* 1954, *Proceedings*, p. 70–73. pub. **1954.** table, 7 refs. **DWB**—Plant cover influences, net hydrologic effects of increase or denudation of plant cover and productivity effects in range lands at high elevations in the West as a consequence of snow retention measures are considered. Forests and vegetation intercept from 0.5 in. to 5.0 in. of snow, but reduction in loss by evaporation of snow cover retained under the vegetation far exceeds that amount. Vegetation tends to retain soil moisture, but deep rooted vegetation results in depletion of water in those deeper levels after snow melt is over, and in the subsequent need for replenishment of the water lost by evapotranspiration from trees. (*Same item as* 6.8–294, Aug. 1955, *MAB.*) *Subject Headings:* **1. Snow water retention by vegetation 2. Cover influences 3. Evaporation of snow.**—*M.R.*

7G–196 551.578

Eastern Snow Conference, 10th, Albany, N. Y., Feb. 12–13, 1953 [and] 11th, Greenfield Mass., Feb. 11–12, 1954, **Proceedings.** [pub. 1954?] 1 piece. 39 p. tables, photos, figs., ref **DWB**—A symposium of nine papers dealing with ice testing, heat losses from water during winte measurement of frost penetration, water migration in snow, prediction of snow melt runoff, railroa winter operation, glaciers and prevention of sheet ice by air bubbling. The scope of the Easter Snow Conference is outlined and a list of 11 additional papers published elsewhere is added. (Fo listing of papers presented at meeting, *see* 6(6):887, June 1955, *MAB.*) *Subject Headings:* **1. Snow re search 2. North America. I. Eastern Snow Conference.**—*A.A.*

7G–197 551.521:551.578.4

Gerdel, R. W.; Diamond, M. and Walsh, K. J., **Nomographs for computation of radiation he supply.** *U. S. Snow, Ice and Permafrost Research Establishment, Research Paper*, No. 8, Feb. 195 6 p. 2 tables, 3 graphs, 7 refs. **DLC**—Nomographs are given for daily total solar radiation, d pending on: a) time of year and latitude (40–90°N), corrected for sky conditions and elevation b) albedo of snow versus age of snow for temperatures above and below freezing; c) solar radiatio absorbed by snow cover; d) radiational heat balance and equivalent melt, considering sky condition e) solar radiation available at a certain depth below the snow surface for snow of a given densit versus solar radiation absorbed by the snow surface. The technical background for these graph is explained in a concise way. (*Same item as* 6.3–120, March, 1955, *MAB.*) *Subject Heading* **1. Solar radiation 2. Radiation balance 3. Thermal balance of snow cover.**—*A.A.*

7G–198 551.596.1:551.578.4

Ishida, Tamotsu and Onodera, Shigeo, **Sound absorption by snow layer.** *Low Temperatur Science, Sapporo, Japan, Ser. A, Physical Sciences*, 12:17–24, **1954.** 3 figs., 6 refs., eqs. In Jap anese; English summary p. 24. **DWB**—The experimental procedure for obtaining sound absorptio coefficients of snow layers is described. The absorption coefficient a_o is given by the formu $\ln(1-a_o)=\frac{4l}{c_o}\left(\frac{1}{t}-\frac{1}{t'}\right)$, where l is length of the tube, c_o is the sound velocity, t' is the decay tim when the tube contains snow. (*Same item as* 6.9–340, Sept. 1955, *MAB.*) *Subject Heading* **1. Sound absorption 2. Snow cover 3. Absorption coefficients.**—*Based on authors' abstract.*

7G–199 551.521:551.524.4:551.554:551.578.46(211.2

Liljequist, G. H., **Radiation and wind and temperature profiles over an Antarctic snow-field— a preliminary note.** (In: American Meteorological Society and Royal Meteorological Society **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953,** pub. **1954.** p. 78–8 7 figs.) **DWB**—Observations at Maudheim are summarized including direct solar radiation, tot (sun+sky, clear or overcast), albedo of snow, extinction of red, orange, light blue and blue light i snow, effective outgoing radiation, temperature and wind profiles 0–10 m above snow (neutral an stable stratification). A wind profile constant $k=u_1/u_{10}$ is defined, where u_1 is the departure fro logarithmic profile, and related to the stability $S=(g\theta)/(\partial\theta/\partial z)$ by $k=\exp(-0.093\ S^{0.53})$. Radiatio balance values are small both in summer (high albedo) and winter (inversion conditions). (*Sam item as* 6.3–122, Mar. 1955, *MAB.*) *Subject Headings:* **1. Radiation balance 2. Vertical tem perature gradient 3. Wind profiles 4. Snow cover influences 5. Maudheim, Antarctica.**— *C.E.P.B.*

7G–200 551.578.4

*Petrovič, Št., **Zmena hustoty snehovej prokrývky za zimné obdobie.** [Variations in sno density during winter.] *Meteorologické Zprávy*, Prague, 7(5):117–121, **1954.** 6 tables, ref. Russia and German summaries p. 117. **DLC**—Variations in snow density were studied during the winte of 1953–54 at 10 stations in Czechoslovakia at elevations from 156–934 m. Data on depths an densities are tabulated. The initial densities of new snow cover varied with snowfall condition and were greater for wet snow and covers formed during snowstorms. Measurements in win protected areas showed lower densities. Snow densities of 0.07–0.10 at the beginning of winte increased with time to 0.25–0.31 under the compacting action of wind, gravity and the processe of snow metamorphism. A maximum density of 0.43 was measured in a 128 cm snow cover in th High Tatra Mts. *Subject Headings:* **1. Snow density variations 2. Tatra Mts., Czechoslovakia** —*S.I.P.R.E. Abstract.*

7G–201 551.575.1:551.578.4

Remarkable temperature variations and fog formation over snow at Stornoway, February 8 1954. *Meteorological Magazine*, London, 83(989):344–347, Nov. **1954.** 2 tables, 2 refs. **DWB**— At 15 h a turning plane threw snow up to 40–50 ft. As the snow settled fog formed and sprea rapidly to a depth of 13–35 ft with a screen minimum of 13.9°F, though snow on roofs at 10 ft wa

melting. The fog is attributed to propeller mixing cold surface air with warm air above, and perhaps cooling of the warm air by snow thrown into it. (*Same item as* 6.3–239, March 1955, *MAB.*) *Subject Headings:* **1. Fog formation 2. Snow cover effects 3. Stornoway, England.**—*C.E.P.B.*

7G–202 551.578.46:551.525.2

*Schuster, Robert L., **Project Mint Julep: investigations of a smooth ice area of the Greenland Ice Cap, Pt. 3, Snow studies.** *U. S. Snow, Ice and Permafrost Research Establishment, SIPRE Report*, No. 19, Oct. **1954.** 7 p. 16 figs. (some fold.), 2 refs. **MH-BH**—Nine snow-profile study sites were established during the 1953 summer field season along a 24-mi E–W base line through the Mint Julep area (S.W. Greenland). Snow studies were made at each of these sites at 2-week intervals beginning in early June and ending Aug. 10. Data obtained on stratigraphy, temperature, density and ram resistance are graphed for each study site. *Subject Headings:* **1. Snow cover density 2. Snow cover hardness 3. Snow cover temperatures. I. Snow Ice and Permafrost Research Establishment.**—*SIPRE Abstract.*

7G–203 551.578.46

Vrba, Miloš and Urbánek, Bedřich, **Průběh metamorfosy, diagenese a teploty sněhové pokrývce, 2 část.** [Metamorphic, diagenetic and thermal changes in a snow cover, Pt. 2.] *Meteorologické Zprávy*, Prague, 7(5):121–127, **1954.** 4 figs., 7 graphs, 5 refs. Russian, English and German summaries p. 121. **DLC**—The physical properties of a snow cover and factors modifying them were studied in the Krkonoš Mts., Czechoslovakia, in 1953–54. Variations in the crystalline structure, hardness and temperature of snow cover as well as methods of measuring hardness are described in detail and the results are discussed. Data on the density of fresh, old and firn snow collected from Jan.–April 1954 are tabulated. Graphs give detailed data on the diurnal variations of temperature within the snow cover, including the effects of weather and snow metamorphism. *Subject Headings:* **1. Diurnal snow temperature variations 2. Snow cover properties 3. Krkonoš Mts., Czechoslovakia.**—*S.I.P.R.E. abstract.*

7G–204 551.578.46

*Yosida, Zyungo and Iwai, Hiroshi, **Measurement of the thermal conductivity of snow cover.** *U. S. Snow, Ice and Permafrost Research Establishment, Translation*, No. 30, Nov. **1954.** 7 p. 5 figs., 2 tables, 13 eqs. **MH-BH.** Translation from Japanese of their article **Sekisetsu no netsu dendō-ritsu no sokutei,** *Seppyō* (*Snow and Ice*), Tokyo, v. 8:48–53, **1946.**—An apparatus for measuring the thermal conductivity of snow layers is described with the aid of a diagram and equations for calculating the thermal diffusivity from changes in air pressure following the sudden alterrations of the temperature of the circulating aqueous solutions of ethylene glycol which is connected with galvanized water tanks enclosing a cylinder containing snow. Results of measurements are presented. A short note **Extracts from the literature on the thermal conductivity of snow cover** by SHIGEGI OGIYA is appended. It contains a graph showing the general relationship between thermal conductivity and snow density. *Subject Headings:* **1. Thermal conductivity of snow 2. Snow cover density.**—*I.L.D.*

1955

7G–205 551.521.14:551.311.12

Dirmhirn, Inge and Trojer, Elfriede, **Albedountersuchungen auf dem Hintereisferner.** [Albedo investigations on the Hintereis Glacier.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 6(4):400–416, **1955.** 8 figs., table, 18 refs. German, English and French summaries p. 400–401. **DWB**—The mean albedo of snow and ice on Aug. 23–Sept. 3, 1954, at 2400–2600 m on Hintereis Glacier (Oetztal) was: dry new snow 0.816, wet 0.740, old snow 0.724; dry firn 0.634, wet 0.539, dirty 0.457; clean glacier ice 0.410, dirty 0.228. The diurnal variation gave a minimum at 1–3 p.m. on clear days (most melting). Calculations are made of the mean albedo of the glacier; after 6 fine days it decreased from 0.70 to 0.45. *Subject Headings:* **1. Albedo of glaciers 2. Albedo of snow 3. Oetztal, Austria.**—*C.E.P.B.*

7G–206 551.593:551.578.4:551.521

Dunkle, R. V. and Gier, J. T., **Snow Characteristics Project.** California Univ. at Berkeley. Institute of Engineering Research, Contract DA-11-190-ENG-3, Final Progress Report, Aug. 31, **1955.** 122 p. numerous figs. and tables, 21 refs., 33 eqs.—This report presents results of research into spectral reflectivity in infrared and visible, total emissivity, snow transmission and albedo, freezing and thawing of soil, using old as well as developing new instruments for measuring and testing the theory in the Donner Summit area of the Sierras. Analysis, review of literature and theory, and description of equipment occupies the report, to which is appended extensive samples of data and records, both original and compiled, and photos of equipment. *Subject Headings:* **1. Optical properties of snow cover 2. Snow transmissivity 3. Albedo of snow 4. Donner's Summit, Cali-**

fornia. I. California Univ. at Berkeley. Institute of Engineering Research II. Contract DA-11-190-ENG-3.—*M.R.*

7G–207 551.578.46:551.311.1

Holtsmark, B. E., **Insulating effect of a snow cover on the growth of young sea ice.** *Arctic*, Montreal, 8(1):60–65, Winter **1955.** 6 figs. **DLC**—The effect of thermal insulation of snow cover on the growth of sea ice during the spring of 1949 was investigated by U. S. Navy Electronics Laboratory at Point Barrow, Alaska. The temperatures through the ice, snow and in the air were measured by means of thermistors and a portable heated wheatstone bridge to determine thermistor resistance in the field. A detailed description of the installation of the equipment is presented. Daily temperature profiles and bi-monthly average temperatures through air-snow-ice are presented and the measurements of temperature and of ice thickness and snow cover are discussed. A relationship has been established between cover thickness and ice growth; "the growth of ice with no snow cover was nearly 50 per cent greater than that under 2 meters of snow." *Subject Headings:* **1. Snow cover influences on sea ice 2. Sea ice cover thickness.**—*I.L.D.*

7G–208 551.521.14:551.578.4

Hubley, Richard C., **Measurements of diurnal variations in snow albedo on Lemon Creek Glacier, Alaska.** *Journal of Glaciology*, 2(18):560–563, Oct. **1955.** 2 figs., 6 refs. German summary p. 560. **DWB**—Summer measurements of incoming and reflected solar radiation were made with Eppley pyrheliometers on Lemon Creek Glacier, Alaska. On clear days albedo varied from nearly .9 (morning) and .82 (afternoon) to about .65 from 9–15 h. On cloudy days albedo near midday was .75 to .8, varying inversely with height of cloud layers. Dry powdery snow is a diffuse reflector nearly independent of solar angle, but recrystallization of old snow introduces specular reflection. (*Same item as* 7.2–156, Feb. 1956, *MAB.*) *Subject Headings:* **1. Albedo of snow 2. Lemon Creek Glacier, Alaska.**—*C.E.P.B.*

7G–209 551.578.4

Nezhikhovskiĭ, R. A., **Nabliudeniia nad stepen'iu pokrytiia mestnosti snegom v vesennii period.** [Observations on the degree of areal snow cover during spring.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:42–43, Jan./Feb. **1955.** table. **DWB**—The extent of snow cover over a diversified landscape was studied with the aid of questionnaires and airplane surveys and the data obtained by these methods are compared. The distribution of per cent of snow area revealed by the questionnaire method indicates a more diversified snow deposit than that revealed by airplane survey; the mean per cent of snow cover is less by the questionnaire than by the air survey method. *Subject Heading:* **1. Snow cover distribution.**—*I.L.D.*

7G–210 551.521.31:551.576:551.578.4

Petherbridge, P., **The brightness distribution of the overcast sky when the ground is snow-covered.** *Royal Meteorological Society, Quarterly Journal*, 81(349):476–478, July **1955.** fig., 3 refs., 2 eqs. **DWB**—The distribution of brightness of a densely overcast sky was measured at Garston on Jan. 4, 1955, after snowfall. Albedo of snow 80%, mean direction of sun nearly *S*, elevation 15°. Brightness in foot-lamberts varied from 200 near zenith (B_z) to 80 on southern and eastern horizons. Averages were fitted by $B_\theta = \frac{1}{2}B_z(1+\cos\theta)$, θ = zenith angle. (*Same item as* 6.11–217, Nov. 1955, *MAB.*) *Subject Headings:* **1. Sky brightness 2. Snow cover effects 3. Garston, Eng.**—*C.E.P.B.*

7G–211 551.584:551.578.4

Robinson, Elmer, **Some instances of unstable surface temperature conditions during an arctic winter.** *Arctic*, Ottawa, 8(3):148–157, **1955.** 6 figs., 3 tables, 3 refs. **DLC**—In this study of the thermal structure of the lower atmosphere at Eielson Air Force Base, Alaska, measurements made on a meteorological tower are reported. The data used are: air temperature at 2 and 29 m, and temperature differences snow-surface: 2 m, 5 m:2 m, 10 m:2 m, 20 m:2 m and 29 m:2 m. Three general types of superadiabatic lapse rates were identified and are described. One is connected with strong insolation of the snow cover, the second involves heavy overcast and an overriding air mass considerable warmer than the surface, and the third occurs during ice fog situations. The insolation-type unstable surface condition permits the rapid transport of water vapor and therefore favors the ablation of snow cover at freezing temperatures. The old age of snow resulting in better heat conductivity may be an important factor in the development of unstable temperature conditions. *Subject Headings:* **1. Micrometeorological effects of snow cover 2. Temperature lapse rates 3. Eielson Air Force Base, Alaska.**—*G.T.*

7G–212 551.542:551.578.4

Smosarski, Władysław, **La pression atmosphérique et la température du sol sous une couche de neige.** [Atmospheric pressure and the temperature of the soil under snow cover.] *Acta Geo*

physica Polonica, Warsaw, 3(3):103–109, 1955. 3 figs., 3 tables. Russian summary p. 108. **DLC**—Variations of atmospheric pressure are of great importance for the ventilation of soil. Air penetrating into the soil can influence soil temperature, but this effect is negligible because of the air's low heat conductivity. However, atmospheric pressure variations can affect soil temperature under a snow cover. This effect is discussed with aid of graphs based on observations made between Jan. 24–March 5, 1954. The rather unexpected results of the study show that soil temperature at 30 cm depth under snow cover depends, mainly, on variations of atmospheric pressure and not on air temperature variations. This is explained by the fact that the snow cover is an insulator which blocks the flow of heat into the atmosphere, and there remains only the action of air penetrating into the soil with the increase of atmospheric pressure which cools the soil, so that the temperature difference between soil and air decreases. *Subject Headings:* **1. Snow cover effects on soil temperature 2. Pressure effects on snow covered soil.**—*A.M.P.*

7G–213 551.584:551.524:551.578.46

*Sprague, V. G.; Havens, A. V.; Decker, A. M. and Varney, K. E., **Air temperatures in the microclimate at four latitudes in the northeastern United States.** *Agronomy Journal*, Madison, Wisc., 47(1):42–44, Jan. 1955. 3 figs., 2 tables. **DLC**—Daily maximum and minimum air temperatures were measured during 1951–53 at 4 stations in the East Coast region of the United States (College Park, Md., New Brunswick, N. J., State College, Pa., and Burlington, Vt.) at levels of 3 in. and 5 ft. Above a well fertilized Kentucky Bluegrass soil with grass kept at a uniform height of 1½ to 2½ in. the copper constantan thermocouples used for sensing were shielded from sun and sky radiation, and were located on level land with no cold air drainage. Average ranges in mean daily temperature at the 2 levels are compared in tables and in graphs for the 4 stations. Greatest daily ranges in maximum temperature occurred during summer at 3″ level (33°–36°F) at the Maryland and New Jersey sites. In winter the greatest ranges were also at ground level (20°–27°F) at the southern stations but due to snow the ranges were less at ground level in Vermont. *Subject Headings:* **1. Microclimatic data 2. Temperature regime over soil 3. Snow cover effects on air temperature 4. Northeastern United States.**—*M.R.*

7G–214 551.579.2

Tajima, Setsuo and Mimuro, Yoshio, **On the melting of snow.** *U. S. Snow, Ice and Permafrost Establishment, Translation*, No. 39, March 1955. 4 p. 5 figs., table. **DLC.** Translation from Japanese of their **Yukai ni tsuite,** in *Seppyo* (*Snow and Ice*), Tokyo, 3:260–263, 1941. **DWB**—Difficulties encountered with snow melt gages are described. Effect of ground temperature is studied and the diurnal variation of snow melt is shown. Amount of water moving in the different layers is computed from the snow density distribution versus height and time. *Subject Headings:* **1. Snow melt 2. Snow melt gages.**—*A.A.*

7G–215 551.578.2

Thom, Herbert C. S., **Climatological analysis of snowfall thresholds.** Paper presented at the meeting of the Northeast Snow Conference, Burlington, Vermont, Feb. 10, 1955. U. S. Weather Bureau, Feb. 7, 1955. 9 p. table, 6 refs., 2 eqs. **DWB**—The climatological analysis for the first occurrence of 24-hr snowfalls of various depths is developed. This gives the probability function of snowfall thresholds which in turn makes any quantiles or probability values readily available. The probability function together with a special convention on years with no threshold value leads also to a definition of mean or expected threshold date. Examples of applications to several thresholds using data for 5 New England Stations (Portland, Hanover, Pinkham Notch, Rutland and Lake Placid) for 20–31 yrs are presented. *Subject Headings:* **1. Statistical analysis of snowfall data 2. Snowfall depth frequency data 3. New England.**—*Author's abstract and M.R.*

7G–216 551.578.4:624.024

Thomas, Morley K. (*Met. Div., Toronto*), **Method of computing maximum snow loads.** *National Research Council of Canada. Div. of Building Research, Research Paper*, No. 15, March 1955. 6 p. 4 figs., table, 8 refs. Reprint from *Engineering Journal*, Montreal, v. 38, Feb. 1955. Price: 10 cents. **DLC**—Computed maximum snow loads have been derived from extreme snowfall, snow cover and rainfall data in the decade from 1941 to 1950. The derived loads are evaluated against those obtained from building codes now in use in major Canadian cities and found to be comparable in most cases. The value of these derived loads in smaller municipalities is mentioned. *Subject Headings:* **1. Maximum snow load computation 2. Canada.**—*Author's abstract.*

7G–217 551.578.46(795)

*U. S. Corps of Engineers. Snow Investigations, **Analysis of February 1951 rain on snow in a densely forested area.** Its *Research Note*, No. 24, April 15, 1955. 23 p. 2 plates, 6 tables, 20 refs. **DWB**—A study is presented of a rain-on-snow event characterized by a minimum of snowfall which

occurred during Feb. 1951 in the Mann Creek Basin when it had a 100% snow cover. The analysis includes a study of the water balance; thermal deficiency of the snow pack; water absorption by dry snow pack; time, place and areal distribution of precipitation; melting of snow intercepted by trees; long wave conduction and convective snow melt; rain melt; short wave melt; ground melt; and total melt compared with change in water equivalent. An analysis was carried out by subperiods. The appendix contains an attempt to determine a functional relationship between wind speed and eddy conductivity of heat and moisture in the Mann Creek Basin (Oregon). Computed data are given in graphs and tables. *Subject Headings:* **1. Rain on snow 2. Snow pack 3. Snow melt 4. Mann Creek Basin, Oregon.**—*I.L.D.*

7G–218 551.579.2:551.508.7

*U. S. Corps of Engineers. Snow Investigations, **Lysimeter studies of snow melt.** Its *Research Note*, No. 25, March 1, 1955. 41 p. 5 tables, 6 plates (fold.), eqs. **DWB**—Runoff from an unforested 600 sq ft snow-lysimeter area is used as a measure of snow-melt quantities. The component melts due to radiation, convection, and condensation are computed from measured meteorological parameters and compared with the gaged runoff. Radiation and condensation melts are independently determined, the former from radiometer measurements and the latter from special moisture-exchange experiments. The residual (the difference between the lysimeter runoff and the melts from radiation and condensation) is considered to be due to convective heat transfer from the air. The magnitudes of and means of estimating the melt components are thus determined, special emphasis being given to the determination of condensation and convection melts. Equations for condensation and convection melts are presented which express melt as a function of the products of wind speed and the vapor-pressure differential between the air and snow (for condensation) and of wind speed and the temperature differential between the air and the snow (for convection). The equations so determined result in condensation melts of the same order of magnitude as those previously determined by SVERDRUP (1936), and convection melts of approximately one-third SVERDRUP's. The results of this study are used to compute daily snow-melt amounts with a standard error of estimate of 0.05 in. This is for daily melt quantities averaging 1.23 in. and having a standard deviation of 0.31 in. The resulting correlation coefficient is 0.985. *Subject Headings:* **1. Snow melt: runoff 2. Lysimeter observations.**—*Author's abstract.*

7G–219 551.578.46

Wilson, W. T. (*Hydrologic Services Div., U.S.W.B.*), **Density of new fallen snow.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 42(51):7–8, Dec. 19, 1955. **DWB**—Figures show percentage frequency of water equivalent of new snow measured during 295 storms, 1919–1948 at Burlington, Vt., indicating a range from 2.5% to 22% water, with a mode about 6% to 10% (peak 9%); and double-mass curve of snowfall vs. water equivalent 1919–48 for Miles City, Montana, show average density 8.1% for entire period, but 6% for 1936–48, and 10% for 1919–29. This "trend" is typical of U. S. Weather Bureau stations which used to use the arbitrary 10% rule but gradually changed over in the 1928–40 period to using measured water equivalents. At any rate the 10% rule is too high for most areas where snow is dry and hence introduces a bias. *Subject Headings:* **1. Snow water estimation 2. Snow cover density 3. Burlington, Vt. 4. Miles City, Mont.**—*M.R.*

7G–220 551.578.46

Yosida, Zyungo et al. (*Inst. of Low Temp. Sci., Hokkaido Univ.*), **Physical studies on deposited snow, Pt. 1, Thermal properties.** *Sapporo, Japan. Hokkaido Univ. Institute of Low Temperature Science, Contributions*, No. 7:19–74, 1955. 41 figs. (incl. photos and graphs), 5 tables, 26 refs., 58 eqs. **DWB**—This excellent experimental and theoretical study on the thermal properties of deposited snow is based upon laboratory and field studies conducted on the grounds of Hokkaido University in Sapporo City. The contents include the following: heat conductivity of deposited snow; the diffusion of water vapor through snow cover caused by temperature difference, experimental determination of coefficient D of macroscopic diffusion of water vapor through snow; the metamorphosis of snow crystals in an atmosphere of uniform temperature, various aspects of the metamorphosis of snow crystals such as sublimation of snow crystals, collection of foreign matter contained in snow crystals as a result of sublimation, curvature of crystal surface as the cause of metamorphosis by sublimation, elastic stress as the cause of metamorphosis of ice grain constituting snow, observations on the root of branch of snow crystal when it is being cut off by sublimation; metamorphosis of snow crystals under a temperature gradient; the temperature gradient in the actual snow cover; and contributions of water vapor to the heat transfer in snow cover. Diagrams of apparatus used, data and photographs of snow crystal metamorphosis, snow crystals and of ice grains, hoar crystals, etc. are presented. *Subject Headings:* **1. Thermal conductivity of snow cover 2. Water vapor diffusion through snow cover 3. Snow crystals 4. Sapporo, Japan.**—*I.L.D.*

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7G–221 551.521.14:551.578.46

Dunkle, Robert V. and Bevans, J. T., **An approximate analysis of the solar reflectance and transmittance of a snow cover.** *Journal of Meteorology*, Boston, 13(2):212–216, April **1956.** 3 figs., 3 tables, 11 refs., 23 eqs. **DWB**—Experimental measurements of attenuation in a snow cover do not give consistent results, hence calculations are based on SCHUSTER's ideal model for gaseous stars, assuming a homogeneous medium of constant optical density. The computed albedo of a pure snow cover ranges from 0.80 with particle size 0.001″ to 0.62 with 0.1″, thus decreasing with aging of snow cover. Variations occur owing to presence of impurities and with spectral distribution of sun and sky radiation. *Subject Heading:* **1. Albedo of snow.**—*C.E.P.B.*

7G–222 551.311.11(99)

Loewe, F., **Contributions to the glaciology of the Antarctic.** *Journal of Glaciology*, 2(10):657–665, March **1956.** fig., 6 tables, 26 refs. German summary p. 657. **DWB**—Average wind at Point Martin, Adélie Land, was 29 m/s in March 1951. At Point Géologie, 40 mi. to west, it was only half as strong. Snow deposits are entirely rounded wind-driven grains in dunes and sastrugi, the density of surface layers exceeding 0.4. The annual accumulation equals 25–30 cm water. Radiation balance at Port Martin is negative except in Dec.–Jan., on ice cap except in Dec. The loss is made good by influx of warmer sea air. Snow temperatures are lower at 10 cm than at 20 cm and also lower than air temperature. Mean annual temperature on ice cap varies from 10°F at MSL to −30°F at 6400 ft. On a blizzard day 240,000 tons of drifting snow are estimated to cross each km of coast. *Subject Headings:* **1. Antarctic glaciology 2. Blizzards 3. Radiation balance over snow 4. Adélie Land.**—*C.E.P.B.*

7G–223 551.578.46:551.582(988)

Miller, David H., **The influence of snow cover on local climate in Greenland.** *Journal of Meteorology*, 13(1):112–120, Feb. **1956.** 5 figs., 2 tables, 49 refs. **DWB**—VOEĬKOV's classic theory of effect of snow cover on climate is revised using observations on the Greenland inland ice. In winter during storms heat is brought in by advection and subsidence and loss by long wave radiation is decreased. This heat is stored in the lower air and surface layer of snow. Between storms it is dissipated by long wave radiation and a local climate develops. The cycle lasts $7\frac{1}{2}$ days and storage and dissipation amount to 100–150 cal/cm^2. In summer there is a similar diurnal cycle, storage and dissipation between periods of high and low sun amounting to about 30 cal/cm^2. These thermal balances are shown in tables and graphs. *Subject Headings:* **1. Snow cover effects on climate 2. Thermal balance of snow 3. Climate of Greenland 4. Greenland.**—*C.E.P.B.*

PART III. REVIEWS OF RECENT IMPORTANT METEOROLOGICAL MATERIAL, AND METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The references to reviews of new books or monographs and the contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of publication, the pagination may be omitted.

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

Abbe, Truman: **Professor Abbe and the isobars: the story of Cleveland Abbe, America's first weatherman.** N. Y., Vantage Press, 1955. 256 p. Price, $3.50. Review by Malcolm Rigby in *Weatherwise*, Boston, 9(3):98, June 1956. (*See* 7.3–5, March 1956 **MAB,** for abstract.)

Akademiia Nauk SSSR. Botanicheskii Institut: **Pustyni SSSR i ikh osvoenie, Tom 2** [Deserts of the U.S.S.R. and their utilization, Vol. 2]. Moscow, Akademiia Nauk SSSR, 1954. 801 p. Price, 50 r. 55 k. Review by M. P. Petrov in *Vsesoiuznoe Geograficheskoe Obshchestvo, Izvestiia*, 88(1):95–98, Jan./Feb. 1956.

Avsiuk, G. A.: **Temperaturnoe sostoianie lednikov** [Temperature regime of glaciers]. *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 1: 1955. Review by M. Tyczyńska in *Czasopismo Geograficzne*, Warsaw, 27(1):57–58, 1956.

Golding, E. W.: **Generation of electricity by wind power.** London, Spon Otd., 1955. 318 p. 101 figs., bibliog. p. 295–305, numerous references. Review by C. W. Marshall in *Nature*, London, 177:1050–1051, June 9, 1956.

James, Preston E. and Jones, Clarence, F. (eds.): **American geography: inventory and prospect.** Pub. for the Association of American Geographers by Syracuse Univ. Press, 1954. 590 p. 33 figs., bibliogs. Review by I. P. Gerasimov in *Pochvovedenie*, Moscow, No. 2:107–111, 1956.

Koschmieder, H.: **Ergebnisse der Deutschen Böenmessungen, 1939–1941** [Results of German squall measurements, 1939–1941]. Brunswick, Vieweg und Sohn, 1955. Review by E. Heyen in *Angewandte Meteorologie*, Berlin, 2(7):223–224, April 1956.

Kuenen, P. H.: **Realms of water.** Rev. version, trans. by May Hollander. N. Y., Wiley, 1955. 327 p. illus., plates. Price, $6.50. Review by Edward S. Goldberg in *Science*, Wash., D. C., 123(3208):1135–1136, June 22, 1956.

Mrose, H.: **Klima und Wetter in ihrer Wirkung auf den Menschen** [Climate and weather in their effect on man]. Wittenberg Lutherstadt, A. Ziemsen Verlag, 1955. Review by G. Hentschel in *Angewandte Meteorologie*, Berlin, 2(7):224, April 1956.

Penman, H. L.: **Humidity.** London, Institute of Physics, 1955. 71 p. 19 figs., 6 tables, 24 refs. Review by Malcolm Rigby in *Weatherwise*, Boston, 9(3):100, June 1956.

Saucier, Walter J.: **Principles of meteorological analysis.** Chic., Univ. of Chic. Press, 1955. 438 p. figs., tables, refs., eqs. Price, 75 sh. Review by J. M. Stagg in *Nature*, London, 177(4517):956, May 26, 1956. (*See* 7.3–7, March 1956 **MAB,** for abstract.)

B. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Akademiia Nauk SSSR, Izvestiia, Seriia Geofizicheskaia, No. 2, Feb. 1956

XXs"ezd Kommunisticheskoĭ partii Sovetskogo Soiuza i geofizicheskie nauki, [22nd Convention of Communist Party of the Soviet Union and the geophysical sciences], p. 121–123

Fomin, L. M.: **O glubine proniknoveniia vetrovykh techeniĭ v more,** [The depth of penetration of wind current into the sea], p. 172–181

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American Geophysical Union, Transactions, Vol. 37, No. 2, April 1956

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American Meteorological Society, Bulletin, Vol. 37, No. 5, May 1956

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Dammann, W.: **Vor einer Neuordnung des Beobachtungs- und Arbeitssystems der praktischen Klimatologie?** [Improvement of the observation and working methods of practical climatology?], p. 1–10
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